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TROPICAL DISEASES BULLETIN

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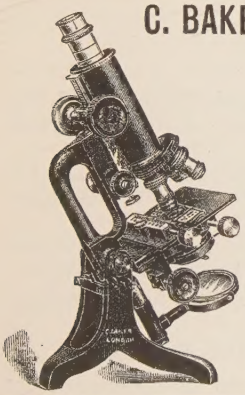

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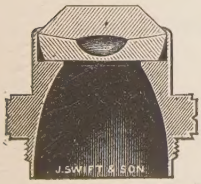

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January 24th, 1913.—Chemical, Biological and Clinical Study of GALYL, by Drs. DE BEURMANN (St. Louis Hospital) and TANON (communicated to the Société des Hopitaux de Paris).

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The Intramuscular Injections of GALYL, by Dr. BALZER.

MEDICAL ANNUAL (1914).—Syphilis.

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TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 6.] 1915. [No. 3.

LEPROSY.

BAYON (H.). **Leprosy: A Perspective of the Results of Experimental Study of the Disease.**—*Ann. Trop. Med. & Parasit.* 1915. Mar. 18. Vol. 9. No. 1. pp. 1–90. With 6 plates.

This important paper gives an excellent and comprehensive resumé of our knowledge of the subject up to date. After a short historical introduction the author discusses the clinical and microscopical characters of the disease and, in an especially full manner, the attempts at the cultivation of the bacillus and its experimental transmission to animals. The questions of its communicability, treatment and prevention are gone into; and a series of beautifully executed plates are given illustrating the author's observations on the cultivation of the bacillus of human and of rat leprosy, and on the transmission of the disease to animals, as well as photographs of "serpiginous" or "lupoid" leprosy, and of the effects of the intradermal injection of a cultural extract in the treatment of leprosy. His conclusions are as follows:—

"Though numerous questions are as yet unanswered in the pathology of leprosy, and many points are still under discussion, it cannot be denied that the researches of the last ten or fifteen years have opened up further fields of fruitful investigation, and helped to elucidate several obscure problems.

"It is true that the results of some experimental observations are so diametrically opposed that it appears hardly possible that both can be correct, at least not in their entirety. This is no new feature in the study of diseases whose investigation presents more than ordinary difficulties, Malaria is a good example. First of all bacteria were isolated time after time from patients, and it was sturdily maintained they were the etiological factors of the disease. Then the protozoa in the erythrocytes were stated to be artefacts by men eminent in various branches of medicine. Later on the plasmodia were found in marsh water and so forth. Finally, the present conclusive standpoint was reached, but the path to truth was strewn with the thorns of controversy and deeply indented with the pitfalls of erroneous deductions.

"This comparison explains the present position of leprosy research. The exercise of sound and reasoned scientific criticism ought to enable us to unravel, in course of time, the delicate and elusive thread of positive fact from the tangled skein of mistaken interpretations of essentially correct, but irrelevant observations.

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"The main conclusions which can be deduced from a perspective review of recent experimental study of leprosy appear to be concentrated in the following main points :—

Cultivation of Hansen's "bacillus."

"Any micro-organism isolated from lepers which claims to correspond to the acid-fast rod seen in lesions should be identified by injection into animals and the following production of the well-known histological features of lepromas.

"The culture of Kedrowsky and those similar to this type are the only ones to fulfil this essential postulate.

Clinical features of leprosy.

"In addition to the nodular, maculo-anaesthetic and mixed types, a further variety is recognisable, with thick raised patches, which may be more or less confluent and circinate, containing numerous giant cells, and very scanty acid-fast rods.

Histological appearances of typical leprotic lesions.

"In dermal nodules and corresponding lepromas of inner organs, there occur numerous matted masses of acid-fast rods, intracellularly and extracellularly situated, very slight tissue reaction and scanty giant cells.

"The lesions of inner organs which show caseation, necrosis or numerous giant cells of the Langhans type, appear in some cases to be due to tuberculous complications. Guinea-pig inoculations only can conclusively decide the nature of such appearances.

"Maculae show the features of slight chronic irritation due to the action of minute doses of bacterial toxins. This, in addition to the external resemblance between maculae and the erythema produced by injecting the water soluble contents of various acid-fast cultures into lepers, seems to postulate that leprotic maculae may be the result of a local reaction similar to the one resulting in von Pirquet's and similar tests for tuberculosis.

Rat leprosy.

"This spontaneous disease presents numerous points of resemblance to leprosy, and may yet be found to be etiologically related to the human malady.

"Its experimental transmission in rodents only causes analogous but not identical effects to the spontaneous disease.

Transmission to animals.

"The negative results of numerous experimental inoculations of human beings, and the relatively low infectivity of leprosy, should prepare us to face very numerous unsuccessful results in dealing with this question. It is only by injecting a large series of animals in various ways, and then observing them for prolonged periods, that deposits of acid-fast 'bacilli' can be produced in the inner organs which have the essential histological features of the leproma.

Serology.

"Wassermann's test is incapable of distinguishing in every case syphilis from leprosy. The same applies to Eitner's test. Noguchi's luetin test is negative in lepers whose disease is not complicated by syphilis.

"Leprotic sera often show spontaneous absorption of complement. The serological distinction of leprosy and tuberculosis is not possible in every case. Tuberculine tests may be present in lepers showing no clinical symptoms of tuberculosis.

"Agglutination is so far of little value owing to self-clumping of acid-fast bacteria and low titer of leper sera.

Contagiousness.

"The communicability of leprosy by direct and indirect contact, especially under defective hygienic conditions, has been established by numerous repeated and independent clinical observations.

Treatment.

"Leprosy, especially the macular variety, is subject to spontaneous remissions and self cures. Chaulmoogra oil is indicated for nodular cases; cultural extract for macular lepers (as far as the present experience goes).

Prevention.

"Registration and sanitary inspection of lepers' habitations; segregation in asylums, settlements or colonies; early separation of children from leprous parents; betterment of hygienic conditions where leprosy has spread extensively."

P. S. Abraham.

RINGENBACH (J.) & GUYOMARC'H. **La Lèpre et le Pian dans les Territoires parcourus par la Section Française de la Mission de délimitation Afrique Equatoriale Française-Cameroun en 1912-1913.** —*Bull. Soc. Path. Exot.* 1915. Mar. Vol. 8. No. 3. pp. 124–130.

Leprosy.—Leprosy has been observed all over French Equatorial Africa, and the natives have no fear of its contagion and do not isolate the sufferers. Men and women are equally affected. The authors met with cases scattered and sometimes in small foci, e.g. at Abié seven cases. From the sea to Ivindo there were 25 cases of leprosy in 1,500 individuals examined, from Sangha to Lobaye 24 in 2,250, and from Lobaye to Ouham 2 in 200. Most cases were of the mixed type. The diagnosis was not always easy from syphilitic and phagedenic lesions—careful search of the skin for discoloured and anaesthetic patches and microscopical examination for the bacilli were necessary. At Abié the nasal mucous membrane of only two out of seven cases showed bacilli.

The natives take no precautions against leprosy and have no special treatment for it—they simply cover the sores with their usual mixture of powdered red-wood and palm oil. Nevertheless, the disease does not seem to be at present increasing among the populations of the Congo, where it has existed from remote times. There must be some factor in its propagation with which we are unacquainted; for there is a flagrant contradiction between the complete absence of prophylaxis and its little increase.

P. S. A.

McCOY (George W.). **Statistical Study of Leprosy in Hawaii.**—*Treasury Dept. U.S. Public Health Service. Public Health Bull.* No. 66. 1914. Sept. pp. 17–26.

A careful statistical analysis of the lepers of Hawaii up to January 1914. Since 1909 the apprehension and detention of lepers have been conducted under a territorial law. The author observes that "if this law were obeyed, there would be no trouble in having every leper isolated promptly." Since the year 1900, 1,058 lepers have been apprehended, and about half of them were patients between the 11th and 25th years inclusive. Eight were children between one and five and 56 children aged six to ten. About one third of the total number were persons in the second decade of life.

"One of the remarkable facts about leprosy and one for which there is no satisfactory explanation is that the incidence of the disease, practically

everywhere, is almost twice as high among males as among females. . . . . Association with lepers was admitted in nearly 37 per cent. of all cases, and the presence of the disease in a parent or brother or sister constituted over half of the acknowledged associations."

The statement so frequently made that prolonged and intimate contact with leprosy is needed to bring about infection is certainly not borne out by the facts in Hawaii. Cases are all too frequent in which there is absolutely no history of any association with lepers, and this is true in some cases where the statement of the patient can be verified by reliable collateral evidence. It is notable that association with a leprous husband or wife occurred in only 28 out of 1,060 cases. One attendant at a leper hospital was affected and Dr. McCoy knows of two other cases in persons who were employed at the settlement. He observes :—

"The length of time that symptoms have existed before the patient comes under the control of the Health Authorities is probably a very important matter in determining the success or failure of segregation. . . . . false and misleading answers would often be given. While we are not acquainted with the mode of transmission of the disease and do not know at what time in its course it is infectious, there is no reason for doubting that the early stages are at least as dangerous as the later ones . . . . An early diagnosis of leprosy is often difficult and sometimes impossible."

Out of 1,060 cases where the clinical signs were positive, the microscopical examination for bacilli in 60 was negative.

Table 12 gives the signs of onset in the cases—426 skin and 311 nerve lesions—in which the manifestations were stated with sufficient definiteness. The nodular cases constitute a larger proportion of lepers now than they did in the past in Hawaii.

P. S. A.

BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE. 1915. Jan. Vol. 7. No. 1. pp. 9–18 & Feb. No. 2. pp. 234–254—**Etude de la Lèpre.** i. By NAZARE-AGA (Ardachir Khan); ii. By PULIDO (Angel); iii. By SERGENT (Edmond) & NÈGRE (L.); iv. By BENTZEN (G. E.); v. By SEIDL (Carlos); vi. By EAGER (J. M.); vii. By RUYSCH (W. P.); viii. By de CAZOTTE (M.).

i. ([Leprosy in Persia.] ARDACHIR KHAN NAZARE-AGA.)

The author gives a short but good account of "tubercular" and "anaesthetic" leprosy. He states that the disease is not endemic in Persia, and that there are only some 80 lepers in the north, in the province of Azerbeidjan near Mianeh. [This statement is not in accordance with the information hitherto before us, unless it be that there has recently been a marked diminution of the disease both in the lowlands and mountains of the country.] He inclines to the contagion theory, and refers to the views of MARCHOUX in connection with the role played by flies in conveying the bacilli, as well as to the observations of NOG in demonstrating acid-fast bacilli in mosquitos.

ii. (Communication sur la lèpre. Par M. le Dr. Angel PULIDO.) [Spain.]

The most recent work on the subject of leprosy in Spain is in Dr. Ph. HAUSER'S "*La Geografia Médica de la Peninsula Ibérica.*" From

the statistics of 1878 and 1904 it does not appear that the total number of lepers in 19 provinces of Spain has sensibly altered, although the disease has shown an increase in Alicante, Castille, Valentia, Cordova, Malaga, Grenada and Tarragona, diminution in Corona, Pontevedra, Huelva and Seville, and a disappearance in Albaceta, Avila, Barcelona, Burgos, Lugo, Madrid and Orensa. There is much difference of opinion among medical men in reference to its causation; those in the Eastern Provinces believe in its contagion and recommend isolation, while others, as in Seville, freely admit lepers in the general hospitals and declare that they have never found cases of contagion. In Malaga and Huelva lepers enjoy perfect liberty. In Corona most of the lepers are congregated in the asylum of Santiago where a belief in the heredity of the disease is prevalent. The most recent figures give 117 lepers in Valentia and 176 in Alicante, where a leproserie with isolated pavilions has been established since 1909; 127 lepers have been there received.

In the leproserie at Fontilles " 606 " has been tried as well as ichthyol, nastine, chaulmoogra, and eucalyptus in intramuscular injections. A more accurate statistical investigation of leprosy in Spain is now in course of preparation.

iii. (Note sur la lèpre en Algérie. Edmond SERGENT and L. NEGRE.)

This paper gives a full historical account of the various observations on leprosy in Algeria since 1839. The most important work on the subject was published by GEMY and L. RAYNAUD in 1897, in which they recorded 58 cases—19 indigenous Mussulmans, 8 Israelites, 24 Spanish, 1 Maltese and 6 French or Italian. RAYNAUD in 1904 added 34 cases and additional ones have been reported by other authors. In twenty years, not more than 140 to 150 have been noted altogether, and the majority have been imported particularly from Spain. There are no indigenous centres of leprosy of importance either among the native Mussulmans or the Israelites, and under the improved sanitary conditions which are being introduced the disease is not likely to spread. The measures recommended are registration of cases, prohibition of certain trades, treatment in hospitals in separate wards, and non-admission to the country of foreign cases.

iv. (La lèpre en Norvège par M. le Dr. G. E. BENTZEN.)

The author gives a resumé of the measures adopted in Norway since the middle of the nineteenth century, when the attention of the authorities was drawn to the wide distribution of the malady in that country. In 1854, a medical inspector was appointed, and 1857 sanitary councils were established. Previous to that date, there were 2,833 known cases, 235 in the hospitals and 2,598 in their own houses. By a law in 1877, necessitous lepers were prevented from begging and as far as possible kept in hospitals or isolated in their homes with separate utensils, linen, etc. These measures were extended by a law in 1885 to non-necessitous cases who, except when married, had either to live separately from their families with separate beds, etc., or be transferred to a hospital.

A table gives the statistics of the total number of lepers in Norway—of those kept in hospitals and of those outside from the year 1856 to 1913. A marked diminution is to be noted since 1869. In that year, there were 787 in the hospitals and 1,820 outside—total 2,607; at the end of 1913, there were 181 interned and 104 in their own homes—total 285.

v. (Exposé sur la lutte contre la lèpre au Brésil par Dr. Carlos SEIDL.)

Leprosy was introduced in Brazil by the Portuguese colonists. It is now common in some parts and rare in others: the states of the Amazon, of Para, Ceara, Pernambuco and Bahia furnish many cases; it is less frequent in Pianhy, Maranhao, Rio Grande do Norte, Parahyba, Alagoas and Sergipe. The most dense centres exist in the States of Minas and St. Paul principally in their bordering zones; the States of Rio de Janeiro and Espirito Santo come next; and it is found in smaller proportion at Goyaz, Matto Grosso, Santa Catharina and Rio Grande do Sul. It has recently increased in the state of Parana. There are no reliable statistics as to the number of lepers in all Brazil—a rough estimate is 10,000. The only prophylactic measure employed is isolation in asylums—of which the most important is at Rio de Janeiro—but isolation at home under medical supervision is permitted. The theory of heredity has lost ground among the medical men in Brazil. In our ignorance of the mode of transmission of the disease—directly, or by medium of inanimate objects, or by intermediate carriers of the bacillus—no scientific prophylaxis can be adopted, but the establishment of leprosy cities, in place of hospitals, is to be recommended.

vi. (Renseignements fournis par M. le Dr. EAGER.) [United States.]

In the United States of America there are three leprosy centres: (1) on the Pacific Coast where the majority of lepers are Asiatics; (2) in Minnesota in the region of the Great Lakes where those affected are of Scandinavian race and (3) on the coast of the Gulf of Mexico, especially in Louisiana, Florida and Texas. An official enquiry in 1902 revealed the existence of 278 cases in the United States. Of these 145 were born in the country, and only 72 were isolated; about two thirds of them had contracted the disease in the States. Another leprosy census, taken in 1909, gave a total of 139 cases—50 in Louisiana, 20 in Florida, 16 in Minnesota and 12 in Texas. In 1912 a further count gave a total of 146 lepers. Many cases no doubt have escaped official registration, but in all probability leprosy is diminishing in the States.

The Reports from the American colonies gives the numbers as follows:—Hawaii 696, Porto Rico 28, the Philippines 2,754 (in a population of over six millions), and Panama 7. Lepers are not allowed by law to enter the United States.

[It is difficult to understand this great drop in the number during such a short period of time—half the total number must have disappeared and no new lepers been introduced in seven years—unless the stringent attention of the authorities, and the general "scare" fostered by the public newspapers resulted in the concealment of many cases.]

vii. (Renseignements donnés par M. le Dr. W. P. Ruysch.) [Holland.]

There are very few lepers in the Netherlands—never more than 20 and all come from the Dutch Indies. There is a kind of leper asylum for them—containing in general from three to ten cases. A fresh enquiry in reference to leprosy is now being made in Holland. At present and since 1865 all cases dangerous to the public health must be registered, and the majority of the Superior Council of Health are in favour of including leprosy in the list. If further investigation demonstrates its active contagion or increase in the country, the Government will establish a leproserie and take such measures as may be requisite.

viii. (Indications fournies par M. le Dr. de Cazotte.) [France and Dependencies.]

This paper shortly refers to the existing regulations against leprosy in France and other countries. In April 1914, the notification of the disease was not obligatory in France, but the question was then under consideration by the Sanitary Administration. In the French colonies isolation was the rule, but not always realisable in practice, as the lepers are frequently hidden by their families and evade internment. Leper asylums have been established in the West Indies for many years—one of them at Désirade since 1728. Within recent times, several of these, as in Guiana (1895) and Guadaloupe (1906), have been reorganised and more stringent measures adopted. Leprosy villages, asylums, etc. have also been lately founded in Tahiti, New Caledonia, the French Indies, Indo-China, etc., Madagascar and West Africa. In Madagascar there are nine lazarettes sheltering 4,000 lepers. In Indo-China the number of lepers is estimated at 4,000 to 5,000 in Tonkin, and 5,000 to 6,000 in Cochinchina.

A short reference is made to the laws relating to leprosy in Canada, Germany, Austria, and other places.

P. S. A.

Barbézieux (G.). **Note sur la Lèpre tonkinoise. Distribution géographique de la Lèpre au Tonkin.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 132–147.

Leprosy is found at all altitudes in the lowlands, on the coasts, and on the high plateaux, for instance, of Yunnan in China, over 2,000 metres above the sea level, which is a large centre for the disease. It has probably existed in Tonkin from the earliest times, and in the fifteenth century rigorous laws were enforced in connection with it. The author considers that, at present, neither "contagion" nor "heredity" are proved as etiological factors of leprosy, and that the affection most often appears to have been accidentally acquired, in certain conditions of environment, habitat and food, by subjects predisposed. In his opinion the bacillus of Hansen is far from playing the principal role; and he agrees with Tarn of Rio de Janeiro that it is only a pathological complication of leprosy.

In Tonkin the principal centres are along the coasts and in the delta of the Red River. It is rare in the higher regions, where the conditions of hygiene, food, etc., are more favourable. Until recently

but little accurate information was available; at the present time the author estimates the number of lepers in Tonkin at not more than 4,000—in 1912 above 2,000 were officially known. Among 791 cases there were 576 males (73 per cent.), 195 females (25 per cent.), and 20 children under fifteen years old. These figures differ from those found in Yunnan, where in 85 cases 93 per cent. were males.

In reference to age, in 213 cases only 9 under ten years of age showed the disease; it most often made its appearance between the ages of eleven and thirty—in 63 per cent of the cases. As regards the occupation of the lepers, out of 476, 270 were workers in the rice fields, and the next most numerous class were the coolies—like the former, badly fed, and living under unhealthy conditions.

P. S. A.

BARBÉZIEUX (G.). **Le Bacille de la Lèpre dans Quelques Produits Lépreux et ses Rapports de Fréquence avec l'Age de la Lèpre.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 124–131.

The author observes [as is well known] that the bacillus of HANSEN is not always to be found in every case of undoubted leprosy, and that in some instances it may be demonstrated at one time, but not at another. In 700 cases at the Té-Truong Asylum, Tonkin, the examination for bacilli was positive in the nasal mucous membrane in 328 or 46·85 per cent., in pus in 19·10 per cent., in leproma tissue 22·19 per cent., and in the blood in 2·83 per cent. There seemed to be some relation between the presence of bacilli and the age of the leper—being much more frequent in the young and early cases, than in the old and long standing ones. At the commencement of the disease—within the first years—the bacillus was found in only 25 per cent. of the cases. After the 20th year the organism seemed to disappear.

[As was pointed out by Drs. BOURREL and LE ROY DES BARRES in the discussion on this communication the author did not in his statistics distinguish the "nodular" from the "anaesthetic" forms of the disease. In the former the bacilli are usually to be found readily, at any rate at some period, while in the latter they are with difficulty found except in the diseased nerve trunks. His statistics do not conform with those of other observers.]

P. S. A.

HOSTALRICH. **Impressions cliniques sur l'Etiologie de la Lèpre en Pays Annamites.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 157–166.

In this paper an endeavour is made to prove that "heredity," and not "contagion," is the dominant factor in the etiology of leprosy. The author's observations were made during a period of five years on 68 cases in Annam and Cochin China. He suggests that lepers should be rendered sterile by means of Röntgen rays!

In the ensuing discussion it was pointed out by Dr. CLARAC that "heredity" would not explain the rapid spread of leprosy in New Caledonia—previously free from the disease—after the arrival in the colony of an affected person. Dr. ROTHAMEL, also in opposition to the author's views, alluded to the fact that in 208 cases under his observation only 15 cases had leprosy in the family.

P. S. A.

ROUSSEAU (Paul). **Sur la transmission de la lèpre.**—*Bull. Soc. Path. Exot.* 1915. Feb. Vol. 8. No. 2. pp. 57–58.

In the course of a mission to Casamance and Upper Gambia, where leprosy is abundant, the author had the opportunity of studying this question. He does not believe that any stinging agent transmits the disease, but that the contagion, similar to that of tuberculosis, is effected through aerial and gastro-intestinal channels. It is notable that leprosy flourishes particularly in countries where the people blow their noses with their fingers and eat with their hands. Nasal mucus with bacilli may thus be carried to the common food bowl and the affection passed on to others. The author intends to experiment with apes upon these lines.

P. S. A.

HOPKINS (Ralph). **Medical Aspects of Leprosy.**—*New Orleans Med. & Surg. Jl.* 1915. June. Vol. 67. No. 12. pp. 1015–1020.

Up to the present, 240 cases have been admitted to the Lepers' Home in Louisiana—78 being females and 162 males. About 20 per cent. have near leprous relatives—but no husband or wife has contracted it from a wife or husband. Many new cases in the incipient stage are being admitted in the Home and this indicates that the disease is spreading in Louisiana. Instances are given of periods of incubation of six years and eight years. Two cases of lepra fever were fatal. About 6 per cent. of the patients have become insane. As regards treatment the best results have been with increasing doses of chaulmoogra oil in connection with strychnine and hot baths, and eleven cases have been discharged as cured—*i.e.*, with no clinical evidence of the disease and no acid-fast organisms at the site of previous lesions or in the nasal secretions.

P. S. A.

MATAS (Rudolph). **The Surgical Aspects of Leprosy.**—*New Orleans Med. & Surg. Jl.* 1915. June. Vol. 67. No. 12. pp. 1020–1025.

This paper especially alludes to the surgical results of Drs. GOODHUE and McVEIGH who, with an experience of 6,000 surgical operations in the course of ten years at Molokai, have come to the conclusion that not only excellent results may be obtained by surgery in the amelioration of the disease, but that in an early stage the complaint may be eradicated by careful surgical interference or by the judicious application of suitable topical remedies to the primarily localised lesions.

P. S. A.

McCOY (George W.). **Notes on Leprosy based on Experience at the Molokai Settlement.**—*Military Surgeon.* 1915. May. Vol. 36. No. 5. pp. 413–417.

Causes of deaths among lepers. Contrary to the general impression that leprosy is not directly a common cause of death, the Reports from Molokai show that the disease is itself responsible for about 75 per cent. of the deaths at the Settlement. In a total of 339 deaths during a period of five years, 243 were directly due to the disease and 96 to other causes. Pulmonary tuberculosis is relatively uncommon, causing only 3 per cent. of the deaths.

Prevalence of glandular tubercular infection. When submitted to guinea-pig inoculation tests, it was shown that practically all cases of necrosis of lymph glands were due to infection with *B. tuberculosis.* This frequently developed among the adults, and the axillary and inguinal glands were chiefly affected.

Unusual case of leprous fever. A Hawaian boy of thirteen, with leprosy of mixed type of two years' duration, rapidly developed pyrexia with a copious generalised measles-like eruption—the papules exhibiting numerous acid-fast bacilli, which were also found in the blood. Death ensued in ten days.

Cholesterin-bearing lesions. Cholesterin crystals in large amount were found in two cases ; in the one in hydrocele fluid from a Chinese mixed leper ; in the other in purulent contents from a cyst of a neural leper.

Unusual skin lesions. In two cases smooth, elevated, reddish papules averaging 2 or 3 mm. in diameter and resembling smallpox, were extensively distributed in the one, and confined to the back in the other. Acid-fast bacilli were abundantly found in the lesions.

Therapeutic efforts.—Vaccines. Thirty cases at the Leprosy Investigation Station had been under "Vaccine" treatment—in several for two years. Live as well as dead cultures were used. Pronounced constitutional symptoms sometimes occurred, but "an impartial observer would probably have held that the disease had not been influenced in any decided manner."

Chaulmoogra oil. The author's experience confirms the general view that it is of some benefit in leprosy. He had had several cases under treatment by injection.

Carbon dioxide snow. For skin lesions in leprosy applications at intervals of a week or ten days are sometimes very satisfactory.

Type of cases in regard to segregation. In the author's opinion, lepers of the nerve type, in which bacilli cannot be demonstrated in skin lesions or nasal secretions, and in which ulcerations do not exist, may properly be placed on "parole"—without risk to the community—on the following conditions :—(1) Report to a physician for examination at least once in six months. (2) Not to engage in preparation of food, or serving same, for other persons. (3) To have separate bedding and table utensils. (4) Not to live in the same house with children under sixteen years of age.

P. S. A.

GWYTHER (A.). **Is there a Primary Lesion in Leprosy?**—*Indian Med. Gaz.* 1915. Feb. Vol. 50. No. 2. pp. 41–47.

The author, with the view to discover whether there may not be earlier manifestations of the disease than those generally recognised, carefully analysed the notes taken by Drs. A. and E. NEVE at the State Leper Asylum at Srinagar of over 500 cases between the years 1891 and 1914. He arrives at the following conclusions :—

"1. That there is in leprosy a primary lesion which appears some considerable time before the generally accepted manifestations of the disease, but is unfortunately so small and insignificant as to have been up to now overlooked.

"2. That this primary lesion usually takes the form of a patch of anaesthesia, or small blister, or the two combined.

"3. That it occurs most frequently in those parts of the body which are from anatomical reasons most exposed to injury.

"4. That there is a definite period of time between it and any secondary manifestation, varying with the type of the disease.

"5. That there are in many cases distinct rigors—which are peculiar in being unaccompanied by rise in temperature—between the primary and secondary manifestations.

"6. That the secondary manifestations appear either rapidly, or slowly and gradually, according to the type of the disease."

Several points of interest in reference to aetiology are brought out in the paper. Out of 240 males, in 167 cases or nearly 70 per cent., the patient was the only leper in the family or in the village, and only in 49 cases were there other lepers in the patient's family. In 23 female cases, on the other hand, 18 had other members of the family affected. The author notes "that leprosy is far less common in females than in males, the proportion here being one female to ten males." Of 178 wives who had lived with their leper husbands for periods of from 3 to 27 years, 174 were healthy. Nine leper women had healthy husbands to whom they bore healthy children. One hundred and forty-three parents, one being a leper, were responsible for 350 healthy children; in only two cases was a child diseased. Of nine children, both of whose parents were lepers, six became diseased. [Other figures of interest in this connection are to be found in this *Bulletin*, Vol. 3, p. 188 (McCoy & Goodhue; Bayon).]

At the Kashmir State Leper Asylum none of the staff or their families or any of the dressers and servants have become affected with the disease except in one instance of a dresser at Sabathu Asylum, whose brother and sister and a number of people in his village were lepers, and another of a servant who also had leprosy in his family and in his village. In no case at this Asylum had a leper's wife become infected, and in the course of the last 20 years no child had become leprous who had been born in the Asylum or who had been admitted free from the disease.

As regards the source of infection, the author discards (1) the food theory—either from a fish diet, or from eating and drinking together, (2) contagion, (3) infection by insect bites, and (4) infection through the nares—leprous rhinitis not being an early manifestation. He believes that the disease is one of locality—*i.e.*, "that there must be local conditions of soil, water, or whatever the factor may be, which favours the intensification of the virulence of the disease, or else that there is a missing cycle in the life history of the causative organism which local conditions favour. It is possible that the causative agent of the primary lesion is of the nature of a streptothrix, and that the acid-fast types found in the secondary stages, or the developed disease . . . . may after all prove to be a sporular development."

P. S. A.

Honeij (James A.). **A Study of Leprosy: With Especial Reference to the Pulse and Temperature.**—*Boston Med. & Surg. Jl.* 1915. Apr. 22. Vol. 172. No. 16. pp. 580–584. With 3 charts; Apr. 29. No. 17. pp. 629–638. With 11 charts; May 6. No. 18. pp. 668–672. With 1 chart.

A study of the temperature and pulse of seventeen patients in the Penikese Hospital who had been under observation for various periods

during two years. Fourteen having been under constant observation for 18 months, gave the following results :—

1. There occur a definite clinical temperature and pulse curve diagnostic and prognostic of leprosy.

2. There is a frequent and persistent occurrence of a high morning pulse rate—" morning pulse "—in all cases.

3. A constant high pulse rate is most marked in progressive and advanced cases.

4. A persistent high pulse rate without a corresponding elevation of temperature of prolonged duration is found after " toxic-febrile " attacks.

5. There is a correlation of temperature and pulse in early cases, in contrast to a gradual increase of pulse rate without similar temperature reactions in progressive and advanced cases.

6. Not uncommonly a low evening temperature is present.

7. A marked irregularity in temperature and pulse exists during complications not associated with leprosy.

8. There are typical " toxic-febrile " temperatures and pulse curve reactions.

9. Marked temperature and pulse reactions occur from otherwise insignificant cases, both physical and mental.

P. S. A.

BARBÉZIEUX (G.). **Les Troubles de la Menstruation chez les Femmes Lépreuses.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 147–157.

Observations were made on 99 female lepers in the Tê-Truong Asylum. Of 38 cases which were attacked with the disease before menstruation was established in 91 per cent. the latter was retarded ; in none of them, however, was it completely abolished—leprous ovaritis being, in the author's opinion, much less frequent than is generally supposed. In 61 cases in which the disease appeared subsequently to the onset of menstruation no menstrual trouble was observed.

P. S. A.

FAMBRI (Helene). **Pathologisch-anatomische Beobachtungen über einen Fall von Lepra universalis.**—*Virchow's Archiv f. Patholog. Anat. u. Physiol.* 1914. Dec. 31. Vol. 218. No. 3. pp. 272–299.

This lengthy paper is based upon a case of leprosy in a girl who died, aged fourteen, in Venice. She and her sister had been taken to Brazil when quite young, and both developed leprosy when about seven years old. Elaborate details of the post mortem are given and an account of inoculation experiments on rabbits with an extensive bibliography. The lungs had the appearance of tuberculosis with thickened nodules and purulent cavities, the contents producing tubercle in rabbits. The main conclusion was that both Hansen's and Koch's bacilli may be associated in the same case.

P. S. A.

MAXWELL (J. Preston). **The Treatment of Leprosy by Williams' Leprolin.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 181–184.

The experiments were commenced in April 1912 and 15 male patients have been under treatment. The injections were given weekly at first, and then every fortnight—the results are given up to June 1913. The dose given was 5 cc.; if this amount were exceeded, ulcerations of lepromata and sometimes oedema of the legs were caused. In some cases, a rise of temperature of ·5 to 1° was recorded. In five cases, the results were good—"far in advance of anything the writer had seen in 15 years' practice, and in two cases at least a "marked" leprosy became a "doubtful" leprosy. It is too early to speak of a cure, and in two cases [long standing] that gave the remedy a fair trial the disease has undoubtedly progressed.

The writer is continuing the treatment. P. S. A.

MALEGIN. [**Report on the Treatment of Leprosy with Dr. Carl Spengler's "I. K. lepra" at the Nicolagewsk Leprosy Colony, Siberia.**—Abstract of MS. sent to the Editor. (P.S.A.)].

Dr. Malegin has been in charge of the colony since 1913, and during the past year he has witnessed the "cure" of six cases of leprosy and the decided improvement of several others through the use of SPENGLER'S "I.K. lepra." By "cure" he means that all external symptoms of the disease had disappeared. Dr. PODKATOFF had commenced the treatment in October 1909 and the injections were continued off and on until 1912 with good results. A trial of salvarsan had deplorable results; some of the patients died and in others the disease was aggravated. When Dr. Malegin took charge of the colony he was entreated by the patients to continue the I.K. lepra injections. He began with 30 cases in October 1912, but for lack of material he could only finish the series of injections in 14 of them. In early cases the effect was striking—pigmentation, swelling and ulceration disappeared and the general condition greatly improved. Six of them have been discharged after examination by the Sanitary Officer of the district. All the cases except two had been at the same time taking Oleum gynocardii—but Dr. Malegin ascribes the good results to the I.K. treatment.

P. S. A.

FEDERATED MALAY STATES. **Thirteenth Annual Report of the Institute for Medical Research, Kuala Lumpur, 1913.**—73 pp. With 3 plates. 1914. Kuala Lumpur: Printed at the Federated Malay States Government Printing Office. [Leprosy pp. 7–25.]

Tubes of blood media inoculated with leper material and incubated at 37° C. have now been under observation for two years and no culture of the *Bacillus leprae* has been obtained. A large number of experiments were made with other media: serum-agar, ascito-agar, Clegg's media, with amoebae and cholera vibrios, and numerous sub-cultures. Acid-fast bacilli were only present in subcultures prepared with nodules of tissue, but not in those prepared from emulsions. "Thus by following in detail the directions given by CLEGG we have failed to obtain a culture of the leprosy bacillus. As has been observed in every one of our experiments, there was persistence but no evidence of proliferation."

As the leprosy bacilli are contained in connective tissue, it was considered possible that cultivation of leprous tissue by CARREL's method might solve the problem, but the results were negative.

Experiments on animals—rabbits, guinea-pigs, rats, fowls and a monkey gave no positive results. Acid-fast bacilli were subsequently found only in the situation occupied by the remains of the inoculated nodule.

A number of healthy rabbits taken from the enclosure in which the inoculated rabbits were kept, showed acid-fast organisms in their conjunctival sacs. The presence of these organisms, however, appeared to be temporary, and attempts to cultivate them failed.

P. S. A.

FRASER (Henry) & FLETCHER (William). **Leprosy and Kedrowsky's Bacillus.**—*Lancet.* 1915. July 3. pp. 13–16.

"Many workers have announced their success in cultivating the leprosy bacillus, but as a rule the methods adopted have but little similarity and their success lacks confirmation. For this reason the work of KEDROWSKY calls for special consideration because BAYON claims to have confirmed its accuracy." The authors refer to their own unsuccessful results, and still believe that they have demonstrated the fallacious characters of the various attempts. KEDROWSKY's and BAYON's work is here critically discussed, and further experiments with material sent by KEDROWSKY and BAYON and with their media have confirmed the authors' view. They maintain that "if the organism is pathogenic in animals then the inoculation of moderately small amounts of the culture should produce lesions, though after longer intervals it may be, than are required for their production by large amounts. The fact that they can only be produced by massive injections suggests that these are caused by the large amounts and not by any inherent pathogenicity of the organism." As regards KEDROWSKY's culture it appears that lesions in animals can be produced by injecting the dead as well as the living organisms and the authors describe experiments which show that similar lesions can be produced by dead or living cultures of other acid-fast bacilli like *B. phlei*, *B. smegmae* and Rabinowitsch's bacillus. They conclude that there is no evidence that the acid-fast bacillus of KEDROWSKY is the leprosy bacillus.

P. S. A.

DUVAL (Charles W.). **Pertinent Remarks upon the Bacteriology and Pathology of Leprosy.**—*New Orleans Med. & Surg. Jl.* 1915. June. Vol. 67. No. 12. pp. 1009–1015.

In the author's view, it is not only possible but highly probable that insects of the blood-sucking species act as the means of transfer of the bacillus of leprosy, and that "the determining factor in leprosy infection is hypersensitiveness, a condition established in the human host accidentally." This condition he maintains is due to a primary inoculation, and that a second inoculation in the sensitised subject is necessary for infection. He further believes that the subcutaneous abscesses which occasionally develop in leprosy are the result of tissue autolysis, and that the leper fever is due to the absorption of tissue

cell products rather than to any toxin elaborated by the Hansen bacilli. His recent experimental work supports HANSEN's view that *B. leprae* is strictly an intra-cellular parasite and that it has a selective affinity for the endothelial leucocyte.

P. S. A.

McCOY (George W.). **The Cultivation of Acid-fast Bacilli from Lepers by the use of Symbiotic Organisms.**—*Treasury Dept. U.S. Public Health Service. Public Health Bull.* No. 66. 1914. Sept. pp. 11–15.

"The method of growing acid-fast bacilli from leprous tissues in the presence of amoebas and bacteria was devised by Clegg (1909), whose results have been confirmed by Currie, Brinckerhoff, Hollman and Duval." The latter found that amoebas and cholera vibrios were not essential, and that contaminating bacteria naturally present in leprous tissues will bring about the conditions necessary for the growth of the acid-fast organisms. The author obtained 83 specimens from 52 lepers—64 from nodular, 18 from mixed cases and 1 from an anaesthetic—and secured pure cultures from 11 of these specimens. Forty-six of them were ulcerated nodules or other lesions in which other organisms were found along with the acid-fast bacilli, and these yielded 8 out of 11 successful cultures. "This might be regarded as evidence that the acid-fasts we have isolated from these cases were adventitious organisms which found the conditions of the ulcerating lesions suitable for growth. This possibility cannot be excluded."

Tubes of amoeba agar were inoculated with fragments of the tissue, incubated at 37° C. for about a week, and ten days afterwards examined and transplants made. It was useless to make transplants unless the coccoid forms of the acid-fast bacilli were present.

Subsequent transplants did not always show growth, and sometimes cultures of acid-fast organisms appeared to be thriving to the fourth or fifth generation when they disappeared. Pure cultures were secured in about two months in each of five cases when the culture was in the seventh or eighth generation, one in four and a half months in the fourteenth generation, and one in eight months in the ninth generation.

"It has happened on a number of occasions that what was thought to be a pure culture of an acid-fast organism on amoeba agar, when transferred to plain or glycerine agar gave a growth that would be free or almost free of acid-fasts. . . . The non-acid fasts are the same size and shape as the acid-fasts and like the latter are gram-positive. When a transfer from plain or glycerine agar to amoeba agar is made we again secure what is apparently a pure acid-fast."

The author was unable to produce leprosy-like lesions in mice, rats, rabbits, guinea-pigs and monkeys (Rhesus) with any of these cultures, although the autopsies have demonstrated a wide distribution of the organisms. Only two of the cultures agglutinated with the serum from lepers and then with only a small proportion of the sera used.

"Whether the organisms we have isolated are the true leprosy bacilli or not is impossible to determine at present. . . . If it is not the causative agent of the disease, it is remarkable that it should have been isolated so frequently and under such different conditions by various workers. As a

result of control work with non-leprous tissue we feel certain that these cultures do not represent extraneous contaminations, i.e., these acid-fast organisms were in the tissue secured from leper patients."

The author states that on one occasion he secured a growth of tubercle bacilli (human) on the cholera-amoeba medium as far as the fifth generation.

He sums up his observations as follows :—

"Pure cultures of acid-fast organisms have been secured from 11 of 83 specimens of leprous tissue submitted to cultivation in the presence of symbiotic organisms.

"The cultures were obtained with about equal facility whether amoebas were present or not, and in two instances when contaminations were present in the tissues no added symbiont was required.

"There is a large element of chance in cultivating acid-fasts by the symbiont method.

"The organisms isolated are incapable of producing leprosy-like lesions in laboratory animals.

"Tubercle bacilli will multiply on amoeba agar in the presence of cholera vibrios and amoebas."

P. S. A.

JOHNSTON (John A.). **A Contribution to the Bacteriology of Leprosy.** —*Philippine Jl. Sci.* Sect. B. Trop. Med. 1914. June. Vol. 9. No. 3. pp. 227–230. With 1 plate.

The author, referring to the fact that branched hyphae-like filaments are often seen in cultivations of tubercle bacilli and especially to the observations of JORDAN and FOULERTON, and considering the close relationship of leprosy and tuberculosis, believes that Hansen's bacillus, like that of tubercle, is a stage in the development of a streptothrix. From the spleens of two lepers he succeeded in cultivating non-acid-fast streptothrices apparently identical. In one culture there was a tendency for the filaments to break up into coccoid and rod-like forms which were at first non-acid-fast. In six or seven months a few were noted as retaining the fuchsin slightly, and after a year scattered clumps of distinctly acid-fast bacilli were found as isolated individuals and rods still enclosed in the parent hyphae. In February 1913 a number of guinea-pigs and rabbits were inoculated with 48 hour cultures of the streptothrix. One guinea-pig dying in September showed a few scattered nodules in the enlarged liver. Smears from these nodules exhibited no organisms but many distinctly acid-fast rounded masses, three to six microns in diameter. Cultures in placental agar showed a whitish growth in nine days, of acid-fast long and short rods. Growth in bouillon was slow and the bacillary forms showed a tendency to lose the acid-fast property. Further inoculations were made and the experiments are still being continued. The author is so far convinced that the *Bacillus leprae* is but the acid-last stage of a markedly pleomorphic streptothrix.

P. S. A.

VERROTTI (G.). **Inoculazione di Emulsione di Leproma (Intracardiaca e Sottocutanea) in una Scimmia Inferiore (Cercopittecus); Produzione di un Nodo Primario Sottocutaneo nel Braccio Sinistro (Sede di Inoculazione) e Successiva Produzione di Noduli Secondari nell' Antibraccio destro.** [Inoculation of Leprosy Emulsion into one of the Lower Apes, with Production of a Primary Nodule in the Left Arm and Secondary Ones in the Right Fore-Arm.]—*Giorn. Ital. d. Malat. Ven. e d. Pelle.* 1914. Oct. 27. Vol. 55. Anno 49. Pt. 5. pp. 822–835. With 6 figs.

The author had found by preliminary experiments with rabbits that a positive Wassermann reaction can be obtained by repeated injections of leprous material, and that when such a reaction is established growths can be obtained at the seat of local inoculations. In the present paper he describes the result of further experiments conducted on the same lines with an ape (Cercopithecus ? sp.). The animal received first of all an injection of 2 cc. of an emulsion of leprous material into the circulation by means of heart puncture with a syringe, and three weeks afterwards 0·5 cc. of similar leprous emulsion was injected into the subcutaneous tissue of each fore-arm. After the lapse of fifteen days a swelling of the size of an almond appeared at the seat of each injection, and the skin of both arms began to ulcerate. Three months after the date of the injection both nodules were excised and were submitted to microscopical examination. The sections showed well-stained leprosy bacilli embedded in granulomatous tissue. The Wassermann reaction at this period was variable, being sometimes positive and sometimes negative. At the end of seven months from the date of the first injection, the ulcerations on the arms had completely healed, but several nodules of the size of a pea then appeared on the head and thighs and buttocks. These in turn disappeared at the end of another month. Some of them were submitted to microscopical examination, but leprosy bacilli could not be detected.

The animal having recovered from all the lesions, an interval of four months was allowed to elapse, and then the inoculations were repeated. Two cc. of leprosy emulsion were injected into the heart as before, and simultaneously another two cc. into the left arm. Two and a half months after this second injection a nodule appeared at the seat of inoculation in the arm, and a fortnight afterwards a similar one on the right wrist. There also appeared seven papular eminences on the skin of the right arm, accompanied by an irregular area of skin ulceration. The secondary nodule was excised, and part was used for histological purposes, while the remainder was emulsified with salt solution and injected into another ape. In the part examined microscopically a scanty number of leprosy bacilli were found. The result of the inoculation into the second ape is not stated.

The author thinks that this method of preliminary systemic infection, followed by local inoculation, will yield very satisfactory results.

J. B. N.

CLEGG (Moses T.), McCOY (George W.) & HOLLMANN (Harry T.). **Immunity Studies in Leprosy.**—*Treasury Dept. U. S. Public Health Service. Public Health Bull.* No. 66. 1914. Sept. pp. 3–10.

The authors employed a number of cultures of acid-fast organisms isolated from leprosy tissue, both by Clegg's symbiont method and by

Duval's modification thereof, for agglutination tests with serum from lepers who had not had vaccine or other biological treatment. They found that as a general rule the results were negative. They consider that this fact does not invalidate the cultures as those of Hansen's bacillus for the following reasons:—(1) We know that not every bacterial strain is agglutinated by the corresponding antiserum, and it may be that only an occasional leprosy culture exhibits this susceptibility. (2) The leprosy bacillus in the human body may be in such relation to the tissue fluids that ordinarily agglutinins are not produced. (3) The organism may through its fatty or waxy content, or in some other manner, protect itself from the action of body cells and fluids.

In a series of experiments "patients (lepers) who were inoculated with acid-fast organisms isolated from lepers, produced considerable amounts of agglutinin for acid-fast organisms. We believe that non-leprous persons would have reacted in the same manner."

A number of experiments were made for the purpose of ascertaining which of the bacteriological methods, agglutination, precipitin reaction, or complement deflection, was the most satisfactory for differentiating acid-fast organisms. The results showed that the agglutination test gave more satisfactory and specific results than either of the others.

The authors found that after having been saturated with chloroform the organisms gave serum results similar to those of untreated organisms. Experiments were made to ascertain the complement content of the fresh serum of lepers, and several tables to illustrate this and other points are given in the paper. The summary of their results is as follows:—

"The serum of but few lepers agglutinates any of the acid-fast cultures we have isolated from lepers, and then only with a small proportion of the cultures.

"Lepers injected with acid-fasts isolated from leprous tissues develop specific agglutinins in the majority of instances.

"Agglutination methods afford means of making group classification of the majority of acid-fasts and extracting the fat from the organisms does not make the reactions more specific.

"Immunization of animals (rabbits) with leprous material does not yield agglutinins for any of the acid-fast cultures at our disposal.

"Serum from lepers contains the normal amount of complement.

"Serum from lepers binds complement in the presence of nodular antigen, but the reaction is not specific."

P. S. A.

MATHIS (C.) & BAUJEAN (R.). **La Réaction de Wassermann dans la lèpre.**—*Bull. Soc. Path. Exot.* 1915. May. Vol. 8. No. 5. pp. 252–257.

The authors observe that since 1906 numerous investigations have been published on the subject, and that most of them show that Wassermann's reaction is often positive in lepers. Employing, however, the technique of CALMETTE and MASSOL as used at the Pasteur Institute at Lille in 41 cases of leprosy at Tonkin they obtained 40 distinctly negative results; in one positive case, syphilis was also present with the leprosy. Contrary therefore, to the general opinion, the Wassermann reaction (as carried out by the above technique) is always negative in leprosy. A copious bibliography is appended and particulars of the 41 cases examined.

P. S. A.

JEANSELME (E.) & VERNES (A.). **Réaction de Wassermann et Réaction d'Eitner chez les syphilitiques et les lépreux.**—*Bull. Soc. Path. Exot.* 1915. May. Vol. 8. No. 5. pp. 259–260.

In 1912 Jeanselme gave the results of Wassermann's reaction in lepers and Eitner's reaction in syphilitics (The antigen was prepared from a leproma full of Hansen's bacillus). Positive reactions were obtained in both series. At the present time Eitner's reaction is of no use in establishing the diagnosis between syphilis and leprosy; but Wassermann's, done in series and during treatment with arsenobenzol, is of service as it then becomes negative in syphilis and may remain positive in lepers.

P. S. A.

GELPI (Paul). **Sanitary Control of Leprosy.**—*New Orleans Med. & Surg. Jl.* 1915. June. Vol. 67. No. 12. pp. 1005–1009.

The author considers that the salutary effects of isolation of lepers have repeatedly been demonstrated, but admits that it presents a complex problem. Legislation is the first condition necessary for prophylaxis and since 1883 notification of cases has been required in New Orleans. Further Acts have since been passed in Louisiana (1892, 1894, 1900) for the isolation and treatment of lepers. The mere enacting of laws is not sufficient to control leprosy; the assistance of the medical profession must be enlisted and the public educated to the necessity of active cooperation. Early report of cases would not only diminish infection but would also increase the chance of recovery, for Drs. Isadore DYER and Ralph HOPKINS have reported several cures. In the author's opinion, anaesthetic cases, which may be considered only feebly contagious, might be treated at home and not confined in an institution unless bacteriological findings justify it.

Accurate figures as to the number of cases cannot be procured. There are now 104 cases in the Home in Iberville parish; the disease appears to be on the increase.

P. S. A.

TROPICAL DISEASES OF THE SKIN.

BREINL (A.). **On the Occurrence and Prevalence of Diseases in British New Guinea.**—*Ann. Trop. Med. & Parasit.* 1915. June 30. Vol. 9. No. 2. pp. 285–334. With 8 plates and 1 map.

This paper embodies the results of two journeys to the coastal belt of British New Guinea in 1912 and 1913. In addition to malaria, filariasis and elephantiasis, various types of ulcers, "juxta-articular nodules," gangosa, yaws, and several skin diseases—mainly Tinea imbricata, were encountered in most of the villages visited.

Leprosy was found endemic only in three places—the Trobriand Islands, the Makeo District on the St. Joseph River in the Central Division, and in one district of the Gulf Division. Altogether 18 cases were diagnosed. The three types of the disease were found; the special native name for leprosy is "Kai-gwa -guia." It is not very prevalent in New Guinea.

"*Juxta-articular nodules,*" first described by MacGREGOR in 1901 in New Guinea, has since been found in Java, Siam, Algeria, Senegambia, Madagascar and New Caledonia. The author gives a good account of this disease and bibliographical references. Bacteriological examination of a case did not show "*Discomyces carougeaui*" as found by FONTOYNONT and CAROUGEAU in early nodules in Madagascar. Yaws is widely distributed, the majority of cases being in children.

Syphilis does not seem to have been extensively spread among the natives and was only found in districts where natives had been in contact with Europeans.

Tropical sloughing phagedaena, Ulcus tropicum. As the author observes, a great variety of sores have been included under the name of "Tropical ulcer," and it is probable that many of them are caused through secondary contamination of small or large injuries of the skin, and not all due to one specific organism. They are common in New Guinea, especially in villages built on swampy, muddy ground, standing in some relation to the incidence of mangrove mud. Histological examination of granulation tissue from ten cases, agreed with the results of KEYSSELITZ and MAYER and of WOLBACH and TODD, showing abundant spirochaetes (*Sp. Schaudinii* Prowazek). [The author does not mention the "Leishman-Donovan bodies" which most of us have found in "Tropical Sores."]

"*Contracting Sore.*" A special type of ulcer was met with in New Guinea, healing up with formation of dense scar tissue, leading to contraction of joints, and mostly occurring in young persons. Spirochaetes were found only in the deep rete mucosum of the skin; the granulation tissue did not differ materially from that of the ordinary tropical sore.

"*Ulcus interdigitale destruens.*" Cases resembling the ulcus interdigitale of CASTELLANI and CHALMERS, but differing in their copious discharge and tendency to lead to destruction of the affected toes, were widely distributed in the districts west of Orokolo, and chiefly affecting men.

Gangosa was endemic in most of the coastal districts.

Skin diseases. In addition to the prevalent Tinea imbricata, a few cases of leucoderma were seen, and two cases of true albinism.

A peculiar acneiform affection, leading to destruction and peculiar scar formation was met with throughout British New Guinea. The nose and sometimes the upper lips, cheeks and forehead were covered with pustules, yielding sebaceous matter. Here and there were small patches of smooth scar tissue and depressions with reddish looking fundus. The disease showed a tendency to destroy the affected parts and in two out of eight cases the soft palate and uvula had been destroyed. It seemed very chronic.

There are appended 33 excellent photographs of the various ulcers and affections described in the paper.

P. S. Abraham.

WISE (Fred). **The United States of Colombia a Fertile Field of Research for the Dermatologist.** [Correspondence].—*Jl. Cutan. Dis. including Syph.* 1914. Dec. Vol. 32. No. 12. [Whole No. 387.] pp. 857–859.

In the course of a short sojourn in Colombia, South America, Dr. Wise met with many tropical diseases of the skin—leprosy, elephantiasis, yaws, gangosa, caraate or pinta, sandfly-eruptions, etc., and piedra, which especially affects the scalp and hair of the native Indians. He saw four cases of what he believed to be Madura foot. At Santa Marta, a great banana port, caraate or pinta was very common. Of this disease he observed three types quite dissimilar in clinical appearances :—(1) the leucodermic or vitiligoid type, (2) the polychrome type, and (3) the pityriasic type. The first was the most common, the third was chiefly seen in children. He doubts whether these very divergent types should be included in the one common name of "caraate," and whether they are not caused by different varieties of fungi. He considers the fact noteworthy that while most of the bananas coming from tropical America are handled by labourers affected with the disease, the condition seems to be unknown in the United States and Europe to which the bananas are shipped.

P. S. A.

CHALMERS (Albert J.) & O'CONNOR (A. P.). **Pyosis Corletti in British Soldiers.**—*Jl. Trop. Med. & Hyg.* 1915. Apr. 1. Vol. 18. No. 7. pp. 73–78. With 1 plate.

The author, after referring to the various bullous eruptions recorded in the Tropics by MANSON, CORLETT, CANTLIE, CHRISTY, CASTOR, BERTARELLI and PARANHOS, and MACDONALD, gives an account of an epidemic of bullae occurring among English soldiers in Khartoum. They consider it identical with CORLETT'S "Impetigo contagiosa bullosa" as described by him in American soldiers in Florida, and probably with the cases of bullous impetigo found by SINGH in India, and by CASTOR under the name "Pemphigus contagiosa" in Burma. It can be easily differentiated from the common Impetigo contagiosa by the absence of crusty lesions as a rule, and by the fact that no streptococci can be found ; from Pemphigus acutus from the absence of severe constitutional disturbance and of Demme's micrococcus ; from Dermatosis bullosa plantaris by not attacking the soles of the

feet or between the toes (as so far recorded) and by the absence of streptococci and *Epidermophyton cruris*; and from Pyosis mansoni ("Pemphigus contagiosus" of MANSON) by the fact that it does not primarily or to any great extent attack the axillae and scrotocrural regions, that the bullae are large and not surrounded by an inflammatory halo, and are not associated with prickly heat.

It resembles CORLETT'S "Impetigo contagiosa bullosa" in the initial lesions being small reddish spots, appearing without fever or marked itching, in the bullae arising from apparently sound skin, and later becoming flaccid and spreading peripherally—and light friable crusts or scales may form. The eruption may commence on the head and spread to the axilla and more extensively over the body and limbs. [The accompanying photograph shows the thigh of a patient densely covered with the bullae.] On microscopical examination diplococci were always found and extensive and elaborate series of cultivation experiments and bacteriological reactions lead the authors to identify the organism with DYAR'S "*Aurococcus mollis*."

In order to bring the nomenclature into line with that of MANSON'S eruption and to prevent confusion with true pemphigus, to which it is not allied, and with true impetigo, with which it is closely allied, the author proposes the name "Pyosis Corletti" for the affection.

With regard to treatment the authors recommend an autogenous vaccine combined with local antiseptic therapy—cure being rapid. Isolation and prompt treatment will quickly stop an epidemic.

P. S. A.

CHALMERS (Albert J.) & MARSHALL (Alexander). **Tinea capitis tropicalis in an Egyptian Soldier caused by *Trichophyton discoides* Sabouraud 1909.**—*Jl. Trop. Med. & Hyg.* 1915. Mar. 1. Vol. 18. No. 5. pp. 49–55. With 2 plates and 1 diagram.

In this valuable paper the authors record for the first time the occurrence of this fungus in the tropics, and give a full historical account of the faviform trichophytons, with photographs of the scalp and of the cultivations, and microscopical observations which they had made in the case of a young Egyptian soldier who was affected with the disease. The principal diagnostic points are (1) the presence of an area of inflamed swollen skin which pits on pressure with an exudate coagulating into yellow masses and matting the hair together; (2) the hairs remain relatively long and are not brittle; (3) on removal, the hair is seen surrounded by a white sheath and on microscopical and cultural examination is found to be infected with *T. discoides*. From favus it is easily differentiated by the absence of the typical yellow cup-like formations, and from other known forms of tinea capitis tropicalis by the large size of the spores, by its being an "ecto-endothrix" with a surrounding inflammation of the skin—as well as by its other microscopical and cultural characters. The affection was easily cured with "tobacco soap."

P. S. A.

CHALMERS (Albert J.) & MACDONALD (Norman). **Animal Inoculations of *Trichophyton discoides* Sabouraud 1909.**—*Jl. Trop. Med. & Hyg.* 1915. June 1. Vol. 18. No. 11. pp. 121–122. With 1 plate.

This is the fourth of a series of papers on "Tinea capitis tropicalis' in the Anglo-Egyptian Sudan.

The authors believe that *T. discoides* infection has an "equine" and not "bovine" origin. BANG's and BODIN's cases were infected from horses and experimental inoculations in Egypt have been successful in the case of a donkey but not with other animals—a bull and a monkey. The paper is illustrated by photographs of cultivations.

P. S. A.

CASTELLANI (Aldo). **Tokelau (Tinea imbricata).**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 271–283.

The author gives an excellent and exhaustive account of the disease, giving due credit to the important observations of Sir P. MANSON in 1879-1882, who introduced the very appropriate name of *Tinea imbricata*. The home of this disease seems to have been the Malay peninsula, whence it has spread towards the south, and then east to many islands of the South Pacific, northwards to some parts of China as far as Foochow, and westwards to Burma and Ceylon. The conditions favourable for its development are a warm, damp and equitable climate.

The author has been the first to succeed in cultivating the fungus, which is not an "Aspergillus." He suggests the creation of a new genus—"Endodermophyton'—with probably a plurality of species of which he has cultivated two, viz., *End. concentricum* and *End. indicum*. These fungi grow between the superficial and deep strata of the epidermis and do not invade the hair follicles or cause suppuration. Botanically they are allied to the Achorions. They do not grow readily on solid media direct from the scales; but they do in glucose-broth tubes, whence subcultures on solid sugar media can readily be obtained. He gives details of their growth on various media.

In Ceylon the disease is rare in children and more common in young men, especially in those living in the country.

The lesions formed by *E. indicum* seem to differ slightly from those due to *E. concentricum*, being perhaps more superficial and with the scales not so close together. The affection is easily reproduced in human beings by inoculating the scales, as was done by MANSON, or from pure cultures of the fungi—the latter taking 12 to 20 days for the development of the eruption.

The author gives the differential diagnosis from ringworm, ichthyosis, pityriasis rubra and tinea intersecta. He remarks upon its chronicity and difficulty of cure. The most efficacious treatment he has found to be resorcin, 60 to 120 grains, in one ounce of tincture of benzoin, painted on once or twice daily.

P. S. A.

MEDINA JIMÉNEZ (R.). **Nota sobre Algunas Afecciones Micosicas.** [A Note on Certain Mycotic Affections.]—*Gaceta Med. de Caracas.* 1914. June 15. Vol. 21. No. 11. pp. 113–116. With 1 plate.

The object of this paper is to draw the attention of practitioners in Venezuela to three forms of mycelial disease which have not hitherto been recognised in that country. The first occurred in a tumour of the jaw in a young girl and clinically resembled actinomycosis. The characteristic yellow granules and ray-formation were, however, wanting. The author believes that this disease occurs in cattle in Venezuela, going by the name of "galapago." He gives an illustration of the mycelium found.

The other two forms are described in JEANSELME's text book of tropical mycology,* the first one having been recorded by SABOURAUD as occurring in the Far East. In Venezuela it goes by the name of "empeine caballuno," or horse-ringworm. It seems to be allied to Tinea circinata. The second is a form of lichen which attacks the wrists and ankles, and appears to be contracted by standing in stagnant water†. In China it goes by the name of "Khi-Huen." The author's descriptions are necessarily brief, being chiefly intended to elicit further information; but he gives some good coloured illustrations of the mycelium found in the lesions. Dermatologists are advised to look at the original paper.

J. B. Nias.

ESCOMEL (E.). **Sur la Blastomycose humaine au Pérou et en Bolivie.** —*Bull. Soc. Path. Exot.* 1915. Mar. Vol. 8. No. 3. pp. 90–92.

Under the name "Espundia" the inhabitants of Southern Peru and Northern Bolivia include a number of tropical ulcers the true nature of which is little known. LAVERAN and NATTAN-LARRIER found Leishmania, but in many cases Blastomyces in abundance instead of Leishmania were found by the author.

The disease in these cases commences as a cutaneous ulcer on the neck, forearms, and especially on the legs. Secondarily, after a long interval as a rule, ulcerous growths are developed on the mucous membranes of the mouth, etc., and on the face and ears. The general health may long remain unaffected, but the disease spreads and one of the most persistent and annoying symptoms is profuse and constant salivation.

The parasites are easily cultivated on Sabouraud's and other media, and retain their vitality for months after drying the mucus containing them. Inoculated in guinea-pigs blastomycotic nodules are developed.

Some cases of Espundia in Peru and Bolivia have been cured by "606"; others are unaffected by it. The author suggests that those which yield to salvarsan are due to the Leishman organism, while those which do not are caused by blastomycetes. In the latter cases iodides give the best results.

P. S. A.

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* *Dermatologie Exotique*, Paris, 1904.

† [This would seem to be Tinea Sabouraudi tropicalis (v. CASTELLANI and CHALMERS, p. 1482 of the 2nd edition).—Manual of Tropical Medicine, 1913. London: Baillière, Tindall & Cox.]

SCHOEBL (Otto). **The Etiology of Trichomycosis palmellina in the Philippine Islands.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1914. June. Vol. 9. No. 3. pp. 219–224. With 1 plate.

This affection appears to be common among the white people living in the Philippine Islands. It occurs more frequently in blonds than in brunettes and in the warmer months when perspiration is incr ased. It is not found in the dark races, except in albinos. The author examined microscopically and culturally hairs from a number of cases and found in every case and in every stage of the disease, colonies of "corynebacterium" which he considers to be the cause of the pathological condition. Micrococci and other micro-organisms were found more or less frequently, but not so abundantly nor so constantly.

P. S. A.

SEMON (H. C.). **Case of Madura Foot.**—*Brit. Jl. Dermatol.* 1915. June. Vol. 27. No. 6. (No. 320). pp. 240–241.

Dr. A. C. Semon showed at the Dermatological Section, Royal Society of Medicine, a typical case of Madura foot in an Indian soldier, a native of the North-west Provinces of India, where the disease is not so common as in Southern and Eastern India. The man came with his regiment from India last October, and nothing was observed until after an injury to the foot in January this year, when swelling set in. The patient ascribed the affection to the accident in January but, as Dr. Semon observes, there is little doubt that the disease was contracted before he sailed from the East. About two months after the injury he was troubled with itching and a clear discharge developed. There has been little or no pain and no temperature. The Wassermann reaction was negative and there was no other abnormality. The swollen foot showed an extensive area of darkened skin over the dorsal and tibial aspects, with soft protuberant masses of dusky purple granulation exuding clear and purulent fluid, which contained minute black granules. These were proved microscopically and culturally to be the mycetoma fungus. The cultures and sections were shown.

P. S. A.

FLU (P. C.). **Ein atypischer Fall von Mycetoma pedis, kompliziert mit einer blastomykotischen Infektion.** [Also in Dutch]. *Mededeel. Burgerlijken Geneesk. Dienst. in Ned.-Indie.* 1914. Vol. 3. No. 1. pp. 41–82. With 1 plate.

An interesting case was admitted in 1912 at the military hospital at Weltevreden of an Arab who had lived in Java for several years. He had hurt his foot against a stone six years previously, with the loss of the left big toe nail, and had dressed the wound with his own urine. A growth subsequently appeared on the toe, and this he cut with a razor. The swelling continued and other growths developed around, forming together a large nodulated mass, about the size of a goose's egg, of darker colour than the surrounding skin. In 1912 the left knee joint became swollen and painful, and there was a temperature of 38·4° C. Potassium iodide was given without effect on the tumour, which was removed by a Pirogoff's amputation.

Microscopical, serological and numerous cultural observations proved the existence of both Blastomycetae and a streptothrix.

The whole subject is elaborately discussed in this paper, with extensive tables and references. The author believes that this is the first time that the combination of a streptothrix and blastomycetal infection has been recorded.

P. S. A.

PEPERE (Alberto). **Sul Fungo Parassita di un "Micetoma a Grani Neri" del Piede (Carter), Nostrano.** [*Monosporium apiospermum*, **Sacc.** (*M. sclerotiale*).] **Ricerche micologiche, sperimentali e anatomiche.** [On a Parasitic Fungus from a Case of Mycetoma of the Foot of Indigenous Origin].—*Sperimentale.* 1914. Dec. 11. Vol. 68. No. 5. pp. 531–608. With 6 plates.

An elaborate account of the microscopical and cultural features of a fungus isolated from a case of Madura foot of European origin, the patient never having been out of Sardinia. The disease had lasted for 18 years, and finally the foot was amputated, the conditions of the parts being shown in a coloured plate. The author's conclusions as to the affinities of the organism found are stated in such detail that it is hard for anyone who is not a specialist in mycology to follow them, or to abstract them satisfactorily. Readers interested in this particular subject will therefore do well to consult the original paper.

J. B. N.

SFAMENI (A.). **Dermatite professionali.** [Professional Skin Eruptions.] —*Lavori d. Soc. Ital. di Patologia Esotica.* 1914. pp. 167-174.

A controversial paper, not containing many details, having reference to the author's previous work on the subject of *Dermatite da Canna, i.e.*, the dermatitis produced by handling reeds which have been stacked so as to sweat and become mouldy. A useful bibliography of memoirs on the subject is appended.

[The species of reéd which causes these symptoms is not mentioned—but THIBIERGE (*Pratique Dermatologique*, 1901, Vol. II, p. 448) states that similar symptoms are produced by *Arundo donax*, when stacked; the mould which develops being *Sporotrichum dermatodes*.]

J. B. N.

KIRBY-SMITH (J. L.). **Extensive Creeping Eruption.**—*New York Med. Jl.* 1915. Mar. 13. Vol. 101. No. 11. Whole No. 1893. pp. 506–507. With 2 figs.

The author records 30 cases of a "creeping eruption" during a four years' residence in Florida, but in no case has he found the burrowing larva. The creeping eruption lesions, when first seen, are raised erythematous lines, possibly one-eighth to one-twelfth of an inch above the skin, with a tortuous irregular course, the near by skin becoming slightly erythematous, the furrow rapidly filling with serum, which in the course of a day becomes seropustular. These are either ruptured by the scratching of the patient, or dry up leaving a crusted lesion. New lesions will at times begin within an inch or so from the

old one. The only treatment that has given uniform results in the author's hands has been by cutting the skin over the furrows with a bistoury, and applying tincture of iodine and phenol in equal parts. The author has seen several cases which had been diagnosed as uncinarial dermatitis or "ground itch," which is very common in the Southern States. He gives photographs of a case.

P. S. A.

MACRI (Pietro). **Dermatite pruriginosa da acaro delle fave secche.** [Pruriginous Dermatitis produced by the Acarus of dried Beans.]—*Malaria e Malat. Paesi Caldi.* 1914. Sept.-Dec. Vol. 5. No. 5–6 pp. 340–343.—*Lavori di Soc. Italiana Patologia Esotica.* 1914. pp. 176–178.

An account of an eruption which attacked all the members of a gang of two men and ten women who were employed in handling a wagon-load of dried beans. The symptoms commenced with an intense itching on those parts of the body which were exposed to the dust arising from the handling of the beans, namely, the neck, arms, chest, and ankles. The itching was followed by the appearance of an erythema accompanied by vesicles and papules which gave rise to scratching. A sensation of burning in the throat with dyspnoea from inhalation of the dust was also observed, along with cough and the expectoration of mucus, and in two cases there was also a slight elevation of temperature. The symptoms subsided in two or three weeks, but the nature of the treatment adopted is not mentioned. The author attributes the symptoms to the acarus of dry beans (*Pediculoides ventricosus*).

J. B. N.

CORLETT (William Thomas). **Xeroderma pigmentosum following Severe Sun Exposure, with Report of Two Cases.**—*Jl. Cutan. Dis. Including Syph.* 1915. Mar. Vol. 33. No. 3. Whole No. 390. pp. 164–169. With 2 plates.

In this interesting paper the author suggests the sun's rays as an etiological factor in this disease, and describes two cases in which the symptoms commenced after exposure to the sun. He also refers to a number of other cases recorded by various authors which followed sunburn. He observes that the degenerative changes in the skin characteristic of the disease are more likely to take place in skins which do not "tan," than in those white skins which do become darkened. He considers it probable that the condition is primarily dependent on an inherited susceptibility or predisposition, which is called into action by certain rays of the solar spectrum.

P. S. A.

CHALMERS (Albert J.) & DREW (C. M.). **Atrophodermia biotriptica in Natives in the Anglo-Egyptian Sudan.**—*Jl. Trop. Med. & Hyg.* 1915. May 1. Vol. 18. No. 9. pp. 99–102.

The authors discuss briefly our present knowledge of atrophic changes in the skin, and describe cases occurring in the Sudan in old subjects in which the condition is akin to the "biotripsis" described by

CHEATLE in 1909. Hitherto, the only other cases noted in the tropics have been by CASTELLANI and CHALMERS in Ceylon. The fact is emphasised that the atrophodermia is pathological and not a physiological change due merely to old age. It does not occur in every old person; it occurs only in limited areas; and it may occur in younger subjects in exposed areas of the skin. Sections show more or less atrophy of the various layers and elements of the skin, but the elastic tissue does not appear to be affected; there is increase of pigmentation, but no evidence of hyperaemia or inflammation.

The chief clinical diagnostic points are: The shrinking and glazing of the skin in exposed parts in old people, with hyper-pigmentation and scaling.

The paper concludes with a bibliography and plates illustrating the condition on the leg of a native, with photographs of microscopical sections.

P. S. A.

CONCEPCIÓN (Isabelo). **Observations on Mango Rash.**—*Philippine Jl. Sci.* Sect. B Trop. Med. 1914. Nov. Vol. 9. No. 6. pp. 509–513.

Four newly delivered mothers in the Philippine General Hospital were fed with about six mangos daily. A papulovesicular itching eruption was usually produced, which could be made to disappear and reappear by discontinuing and renewing the mango feeding. The rash commonly developed in the mammary regions, the neck and extensor surfaces of the arms—also frequently on the face in the babies.

P. S. A.

GIBSON (R. B.) & CONCEPCIÓN (Isabelo). **The Lymphagogic Action of the Philippine Mango,** *Mangifera Indica* **Linnaeus.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1914. Nov. Vol. 9. No. 6. pp. 503–508.

The transient rashes occurring in the Philippines during the hot season are often ascribed to eating the Philippine mango (*Mangifera indica*). It seems also to intensify the ordinary "Prickly heat." The nursing child may also be affected when mangos are eaten by the mother. Experiments were carried out to determine whether the mango is to be classed with such rash-producing substances as shell fish, etc., which HEIDENHAIN called "lymphagogues" of the first class. Intravenous injections of mango juice were made in dogs anaesthetised with ether, and lymph collected from the thoracic duct. An increased flow of lymph, richer in solids, resulted, as well as a fall of blood pressure and sometimes inhibition of blood clotting.

P. S. A.

HALLENBERGER. **Multiple Angiosarkome der Haut bei einem Kamerunneger.** [Multiple Angiosarcoma of the Skin in a Native of the Cameroons].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Oct. Vol. 18. No. 19. pp. 647–651. With 3 plates.

The patient, aged 26, of the Mabea race, had had the disease four years. It commenced as small growths of the size of a pea or bean

on the left hand and foot, and these had been removed at the hospital. Three years afterwards similar tumours appeared on the extremities of the right side causing pain in walking and in his work. Microscopical examination revealed angio-sarcoma. The internal organs were healthy, but microfilaria were found in the blood, and the author suggests that these may have had some causal relationship.

P. S. A.

BREINL (Anton). **Gangosa in New Guinea and its Etiology.**—*Ann. Trop. Med. & Parasit.* 1915. June 30. Vol. 9. No. 2. pp. 213–232. With 4 plates.

During a short journey in New Guinea the author saw a number of cases of "Gangosa" or "Rhinopharyngitis mutilans," especially on the south coast and in the western part of British New Guinea, where the disease seems to differ in its earlier stages from the affection as described by CASTELLANI and CHALMERS. In New Guinea it commences as a small ulcer on the upper lip, just below the nose, the ulceration spreading and destroying at first the lips, alae and cheeks and secondarily the deep tissues, cartilages and bones. After a time, dense scar tissue is formed, leading to the deformities of the face so characteristic of the disease.

Histories of 17 typical cases are given, and these show that gangosa is a definite morbid entity and can be differentiated from other diseases causing similar lesions, such as syphilis, lupus and leprosy. It is a chronic but very rarely fatal complaint, most of the patients recovering without specific treatment, but with extensive destruction of the face. The majority of the cases seen were in females. Oedema fluid from five early and two later cases treated with Giemsa's stain showed yeast-like cells of the genus "Cryptococcus." The author regards this as the cause of the disease and proposes for it the name "*Cryptococcus mutilans.*"

A table of references is appended together with photographs of twelve cases in various stages of the disease, and drawings of the fungus.

P. S. A.

BERIBERI.

CHAMBERLAIN (Weston P.). **Prevention of Beriberi among Philippine Scouts by Means of Modifications in the Diet.**—*Jl. Amer. Med. Assoc.* 1915. Apr. 10. Vol. 64. No. 15. pp. 1215–1220.

The Philippine scouts are a body of about 5,000 native troops officered by Europeans. They mix freely with the native population who suffer extensively from beriberi. The scouts were formerly also affected, a maximum of 618 and 550 cases being reached in 1908, and 1909. In 1910 changes in the dietary were introduced and from that time the incidence rapidly fell, so that in 1913 there were no cases. The change in diet consisted chiefly in reducing the amount of rice supplied, undermilled rice being substituted for polished rice with a *compulsory consumption* of 1·6 oz. of beans daily. No improvements in the sanitary conditions were made at the time. The eradication of the disease among the scouts at a time when they mixed freely with the general population who still had much beriberi is very strong evidence against the theory held at first in the Philippines that beriberi is an infectious disease.

The author also draws attention to the fact that the Europeans, who mixed freely with the natives and were often on short rations in arduous campaigns, suffered little from the disease. This is explained by the long, so called, incubative period ; for natives subsisting mostly on polished rice this has been found to be from sixty to one hundred and sixty days or even longer. In the white forces the deficiency conditions are rarely likely to last so long.

TABLE IV.

Filipino Ration, Army Regulations 1913, paragraph 1.205 in force from June 1911, till present date.*

Component Articles.	Quantities, Ounces.	Substitutive Articles.	Quantities, Ounces.
Beef, fresh	12	Bacon.	8
		Canned meat.	8
		Fish, canned.	12
		Fish, fresh.	12
		Hard bread.	8
Flour	8	Soft bread.	8
Baking powder, when in field and ovens are not available	0·32		
Rice, unpolished	20		
Potatoes	8	Onions.	8
Coffee, roasted and ground ..	1		
Sugar	2		
Vinegar	0·08		
Salt	0·64		
Pepper, black..	0·02		

* "Scout organizations will be required to use the entire allowance of the meat component, and not more than 16 ounces of rice per day to be used for each ration. The purchase of 1·6 ounces of beans per ration in substitution of the portion of the rice ration not drawn will be made, and use of as large an extent as possible of native products, such as camotes, mongos, and squash, will be required."

In considering the deficiency theory of beriberi the author lays great stress upon two main points :—(1) Many articles of diet other than rice are relatively deficient in the neuritis-preventing vitamines; (2) Exposing food to a temperature above a certain point decomposes the neuritis-preventing vitamines present. He again urges the necessity of state legislation to reduce the prevalence of this preventable disease, " which is a much more serious menace to the oriental races than is typhoid fever to the people of the occident." Many interesting tables are given in the paper, two of which are reproduced.

TABLE VI.

Rates per thousand of admissions for beriberi and for all other diseases among Philippine Scouts.

Calendar Year.	Beriberi.	Other Diseases.
1902	121·42	1,489·14
1903	125·60	1,144·85
1904	74·62	948·59
1905	35·93	1,101·43
1906	36·98	1,138·27
1907	24·58	956·83
1908	121·53	786·24
1909	103·93	727·14
1910	9·22	738·67
1911	0·57	665·97
1912	0·37	616·79
1913	0·00	585·36

P. W. Bassett-Smith.

HEISER (Victor C.). **Beriberi. An Additional Experience at Culion. How can a Knowledge as to its Prevention best be applied from the Standpoint of State Medicine?**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 369–373.

An outbreak of beriberi in the Culion Leper Colony (Philippines) is referred to, which was definitely dependant upon the enforced supply of polished rice. The incidence and mortality rates showed that two months after the polished rice was issued beriberi began to appear and that the maximum number of cases was reached three months after its use was begun, and that three months after the unpolished rice was again issued beriberi cases had completely disappeared. With three thousand inmates in the institution the annual death-rate from beriberi prior to the use of unpolished rice was 201 per 1,000 ; this fell to nil in 21 months when unpolished rice was used, and when polished rice was resumed it again rose to 157 per 1,000, to disappear a second time when the unpolished rice was supplied. The educational methods of combating the disease have practically failed and the author is strongly in favour of heavily taxing polished rice so that its manufacture would no longer be remunerative, and the polished rice would only be bought by the better classes, who are able to supplement its use with many other kinds of food which prevent beriberi.

P. W. B-S.

SCHAUMANN (H.). **Die Aetiologie der Beriberi.** II.—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1914. July. Vol. 18. Beiheft 6. pp. 7–246. [365–604.]

In this elaborate work the author recapitulates the investigations and experiments which have any bearing on the etiology of beriberi. The first part deals with experimental polyneuritis of animals, and the effect of rice, rice extracts, and other preparations on the condition. From these he concludes (1) that malt is the most active anti-neuritic agent, rice bran coming next; (2) the whole of the anti-neuritic substances cannot be extracted with alcohol; (3) the anti-neuritic substances are probably not free in the various foods, but are fairly fast chemical combinations with other substances; (4) the administration of antineuritic extracts greatly increases the appetite of the animals, which is not an unimportant factor. He then discusses "insufficiency" diets, namely those containing sufficient proteids, hydrocarbons, fats and salts but which will not support the life of the animal for long periods. Then follows a discussion on vitamines, anti-neuritic principles, activators, and hormones, all different names for the unknown substances which produce such striking effects on beriberi. He is in almost entire disagreement with FUNK as to the composition and character of vitamines, and believes that they are split off in the process of extraction from some mother substance present in the food, and that this mother substance is combined with phosphorus in some organic compound. He next goes into the consideration of metabolism in beriberi especially the phosphorus changes, and quotes a statement of VEDDER (p. 215) which he takes as supporting his argument that phosphorus-containing substances are the real antineuritic principles. These may be either organic phosphorus compounds (the mother substances of vitamines) or bodies which influence phosphorus metabolism (which he calls "phosphatesen," of the nature of a ferment). The question whether experimental polyneuritis in animals and beriberi are the same diseases requires further investigation.

In his conclusions he states that the pathogenesis of beriberi is not yet clearly established but it seems certain that there is at least one form which is due to diet; whether the others are of an infectious nature is very doubtful, as is the existence of some intestinal flora which destroys the vital substance in the food. In the purification of the phosphorus compounds the lightly attached vitamines in some of them (Phosphatides) appear to get split off; in others (nuclein and nucleic acid) the vitamines are more firmly attached and stronger chemical measures are required to isolate the mother substances, and in the process the vitamines are separated and destroyed; in this way the phosphorus compounds, which in their natural condition have anti-neuritic properties, lose them in the extracts partially or entirely. The antineuritic substances increase both the appetite and the metabolism of the body, causing a more complete using up of the carbohydrates and proteids of the food but they do not affect the phosphorus metabolism. As the quantity of vitamine is so small, it cannot be considered as supplying energy or foundations for cell or tissue formation, but rather to act as an intermediary in certain chemical changes or as a catalizator, and as the animal cannot make these for itself they must be supplied in the food stuffs.

The author believes that the pathogenesis of beriberi can only be explained on the basis of a number of lesions produced by a number of dietary defects; the most important are those produced by direct disturbances of metabolism through insufficient phosphorus compounds in the food, or by indirect disturbances through an insufficient supply of bodies indirectly influencing metabolism (vitamines and *Phosphatesen*). In the milder forms of beriberi and ship beriberi, which more closely resemble the disease in pigeons, the principle factor may be a lack of the indirectly working bodies (vitamines). In the more severe atrophic form both factors probably come into play, especially the want of organic phosphorus compounds. The investigation covers a wide field bearing on the physiology and pathology of nutrition, with the etiology of a series of other diseases endemic in Europe. The monograph, with its excellent list of references, is a powerful attempt to uphold the author's own theories which have previously been published, and is a record of a painstaking collection of minute detail which appears at times very involved and in places almost contradictory.

P. W. B-S.

Bréaudat & Lalung-Bonnaire. **Beriberi Mécanismes de l'Action nocive du Riz décortiqué et de la Protection due à Diverses Substances. Mode de Traitement qui en Résulte.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 331–346.

In opening the discussion on beriberi at the Congress the authors enumerated the various etiological theories held and showed that in their conception none of them was correct. They then went on to describe some analyses of the food supplied to different groups of people, with and without beriberi, and the analyses of the excreta. They applied the knowledge thus obtained to methods of treatment. The following conclusions are given :—

(1) The symptoms of beriberi are those of acidosis and partial inanition, the first resulting from an excess of organic and mineral acids in the intestines, through microbic fermentation of the hydrocarbons, and insufficiency of biliary and pancreatic secretions.

(2) The partial inanition affects the nuclear substances. It is the consequence of intestinal fermentation which wastes abnormally the nucleo-proteids and phospho-proteids of the food.

(3) All substances or foods capable of maintaining normally the intestinal secretions and which insure as complete as possible a utilisation of the proteids, hydrocarbons and fats, are able to protect rice eaters.

(4) For beriberi the injection of 30 cc. of secretine or 2·5 gm. of pro-secretine in 24 hours has given good results without any change of food.

Extracts of fresh rice bran injected in the muscles (50 mgm. in 24 hours) produce identical effects.

P. W. B-S.

BRÉAUDAT. **Sur l'Eclosion du Béribéri Épidémique.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 346–352.

In continuation of the previous report the author shows that many other factors may favour the production of beriberi, such as external conditions which lower the resisting power of the individual, or the infection of the food by ferments, either outside the body or in the stomach. Rice always contains many spores of bacteria but much depends upon the age, storage, and cooking. The spores after ingestion give rise to bacteria which are more or less active in setting up acid fermentation. He gives an example of microbic infection of the rice outside the body. Two prisons only separated by a wall were supplied with rice taken from the same source and similarly cooked etc. In one, beriberi was ten times more prevalent than the other, and this is said to have been due to the insanitary conditions and the enormous number of flies which infected the food before it was consumed. When samples of the two foods were examined in the laboratory, that from the infected prison showed after 24 hours a marked increase in acidity due to fermentations, this producing an acidosis when ingested. Other examples were given. The importance of protecting food from outside infection by flies is thus believed to be well demonstrated.

P. W. B-S.

MAXWELL (J. Preston). **Beriberi in the Province of Fukien.**—[Paper read before a Recent Conference of the China Medical Missionary Association]. 3 pp.

Cases may be divided into (1) imported cases, (2) typical cases arising in Fukien itself, and (3) obscure cases probably of incipient beriberi. The first group are fairly numerous, and mostly come from the Straits Settlements. In the second group, sporadic cases occur all over the province but are most common in the coast ports, especially in Amoy ; these can be generally traced to the consumption of polished rice which is very little used in the country districts. No epidemics have been noted. In the third group, cases of peripheral neuritis are described; these appear to follow dysentery and debilitating diseases which recover on anti-beriberi treatment.

P. W. B-S.

KAWASHIMA (K.). **Zur Beriberifrage. (Die Ernährungsversuche zur Beriberi-Verhütung aus den Mitteilungen der Japanischen Beriberi-Studien-Kommission.)** [Feeding Experiments with a View to the Prevention of Beriberi].—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 373–382.

The author from his own experience and that of others in Japan gave evidence and tables to show that the use of "parboiled" rice was not sufficient to prevent the occurrence of beriberi, but as pointed out by KUENEN the composition of such rice is very variable,

Samples examined in 1909 gave a percentage of 0·6 of P_2O_5, in 1911 from 0·4 to 0·28, and it was possible that the samples used

by the author were deficient in the essential parts. The efficiency of rice as a food may be destroyed before it is cooked and also very largely by the methods of preparation.

In spite of these facts the author maintains the view that beriberi is an intoxication from some agent not yet isolated.

P. W. B-S.

McCowen (G. R.). **An outbreak of Beriberi in R.I.M.S. "Northbrook."** —*Jl. R. Naval Med. Service.* 1915. Apr. Vol. 1. No. 2. pp. 195–197.

This ship, belonging to the Royal Indian Marine, was commissioned in August 1914 for special service in the Royal Navy during the war. Her original crew, consisting mostly of lascars, was supplemented by thirty-four Europeans from H.M.S. "Alert" and the armed launches of the Persian Gulf. In December there was a small outbreak of beriberi affecting only the Europeans. Three cases occurred in quick succession and on medical inspection of the ship's company seven others showed signs of oedema of the legs. One case was acute, with rapid loss of knee jerks, hyperaesthesia, anaesthesia, and dilated heart. No definite cause could be given for the outbreak beyond lack of fresh vegetables and mouldiness of the flour, but it is noted that all ten men came from the same mess, who were supplied with the same food as the rest of the ship's company. As soon as possible fresh vegetables were issued every day and lime juice given. No further cases occurred.

[As the white crew, who were alone affected, were drawn from H.M.S. "Alert" and the armed launches of the Persian Gulf, the disease, which has a very long incubation period, may have been contracted before the "Northbrook" was joined, but its onset was hastened by the dietetic conditions in that ship. The fact that all the cases came from one mess points to over cooking in this particular mess and destruction of the active vitamines present only in small quantities. This outbreak is also a good example of the close relationship which exists between ship beriberi and scurvy.]

P. W. B-S.

Dickenson (George O. M.). **A Personal Experience of Beri-beri.**—*Jl. R. Naval Med. Service.* 1915. July. Vol. 1. No. 3. pp. 323–325.

A man-of-war employed on the arduous and monotonous duties of blockading in the Persian Gulf provides many of the factors which predispose to beriberi. It is interesting therefore to read the personal experiences of Staff Surgeon Dickenson who contracted the disease there. For a year the ship's company lived in a hot, damp climate with a temperature varying from 85° to 67°, the awnings at night dripped with moisture, so that bedding used on deck was always damp in the mornings, accommodation below was poorly ventilated, opportunities for landing were rare, and exercise was difficult to get. The food, though abundant, was mostly tinned, with weekly supplies of fresh meat, fish, vegetables, and fruit, poor in quality and unappetising; rice was rarely used. In the discussion of the etiology eight points are noted, from among which one stands out prominently

as a possible cause why the author alone was affected. For two months preceding the climax of the attack he ate no fresh meat, but took only tinned food or ham, the onset occurring two weeks after going on this diminished diet, but over nine months after joining the ship under these depressing conditions. It is important to note that six cases of beriberi took passage in the ship for 48 hours, the author and a sick berth attendant alone came in direct contact with them, the latter by far the most frequently, yet he did not contract the disease. The clinical symptoms are described; they were of a moderately severe mixed type, and fortunately he made a perfect recovery.

P. W. B-S.

MacKinnon (J. M.). **East Africa Protectorate. Report on the Outbreak of Dysentery and Jubaland Neuritis in the Marehan Patrol, 1914.**—Received in Colonial Office Jan. 15, 1915.

This is a report on an outbreak of dysentery and neuritis in Jubaland among the troops of the Marehan patrol. The former disease was traced to an unsatisfactory food supply, and the unsanitary conditions at Garebahare affected at least 17 per cent. of the troops who had removed to Serenli. On the provision of better food and improvement of the sanitary conditions it rapidly decreased. Cases of neuritis were frequent; these appeared like early cases of beriberi and were sometimes diagnosed as such, but were generally of short duration. It was noticed that the Yaos were mostly infected and for these the food supplied at Serenli was unsuitable; in their own country (Nyasaland) they were accustomed to plenty of fresh fruit and vegetables, which at Serenli were very deficient. The weekly ration in Jubaland was rice $3\frac{1}{2}$ lb., flour $3\frac{1}{2}$ lb., meat (including bones) 4 lb., dates 21 lb., ghee 14 ozs., but it often was much lower, and the rice and flour were frequently stale and bad. The dysentery and neuritis prevailed at the same time and affected most those who had been longest in the country and were employed at the hardest work. When the food was improved both diseases decreased in frequency. Dysentery affected all races but no cases of neuritis occurred among the Somalis.

Treatment for the neuritis was most unsatisfactory; change in locality appeared necessary to bring about a cure. Several important suggestions are offered: greater variety in diet, more frequent renewals of rice and flour, and the establishment at Serenli of a vegetable garden to supply fresh beans, peas, etc., for the troops.

[We have here again a condition simulating beriberi, undoubtedly traced to a deficiency in vitamine-containing food.]

P. W. B-S.

Arabantinos (Anastasius I.). Αραβαντινου (ΑΝΑΣΤΑΣΙΟΥ Ι.) *Μπεριμπέρι; ὑπάρχει ἡ νόσος εἰς τὴν Ἑλλάδα.* [Beriberi; does the Disease exist in Greece?].—„*Ἰατρικὴ Πρόοδος.*" 1915. Feb. 1–15. Vol. 17. Nos. 3–4. pp. 33–37; Nos. 5–6. Mar. 1–15. pp. 79–84; Nos. 7–8. Apr. 1–15. pp. 115–119.

A discussion of the question whether beriberi is to be found in Greece. As rice, although cultivated and eaten in Greece, does not anywhere form the staple food of the people, it is not to be wondered at that beri-beri

is not endemic in the country. The diet of the poorer classes in Greece, as elsewhere in Europe, is deficient in albuminoids and fats and contains an excess of carbohydrates, consisting as it does chiefly of bread. The bread of the poorer classes, however, is the so-called black bread, containing a large proportion of bran, and therefore does not seem to be deficient in vitamines. White bread is only eaten by the more well-to-do classes and is only an accessory in their diet. It is, however, not beyond the bounds of possibility that sporadic cases of the types referable to the beriberi of asylums may occur in Greece as elsewhere in Europe. The greater part of this paper is taken up with a systematic account of the disease and its etiology, such as will be found in most of our text-books. It is probable that the disease is still somewhat of a novelty to the Greek practitioner.

J. B. Nias.

GRIJNS. **Some Remarks on Beriberi and on Polyneuritis in Fowls.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal. Saigon* (1913). 1914. pp. 365–369.

The author draws attention to some facts in support of the alimentary theory of the origin of beriberi and he argues particularly against the misunderstanding that because a patient did not eat rice therefore he could not have beriberi. He states that, granted there exist substances necessary for the maintenance of the nervous system, it is easy to understand that "*Beriberi is not caused by what a man eats but by what he fails to eat,*" and that in every poor diet sometimes the indispensible nerve-food-stuffs may be lacking and so cause beriberi. Also the food supply may be so well balanced that ordinary health is maintained, but when under certain conditions a greater output of nervous energy is required the balance may break down and beriberi develop. The microbic theory of the disease has no scientific proof so far.

P. W. B-S.

NAGAYO (M.). **Referat über Beriberi oder Kakke. Pathologisch anatomischer Teil.**—*Verhandlung d. Japanischen pathologischen Gesellschaft.* 1913. 26 pp. With 7 plates.

This monograph was published two years ago, but as it is frequently quoted and contains very much detail, some reference must be made to it here. Those particularly interested in the subject should however read it in the original; the plates, both plain and coloured, are excellent. The observations are based on the examination of 247 cases of complicated and uncomplicated beriberi, as well as the study of numerous older records. The changes found in the heart, blood vessels, organs, and systems are described in detail, the most striking being depicted in the plates. The author divides these changes into three stages:—(1) retrograde changes, (2) circulatory disturbances, and (3) progressive (restorative) changes.

The first are recognised in the muscular and nervous systems; the primary change is a diffuse parenchymatous cloudy swelling in the voluntary muscles and also those of the heart, arteries, and alimentary tract; when the heart is affected there is produced the venous congestion so marked in cardiac beriberi.

(2). The fatty degeneration and necrosis of kidneys and liver, the glycogen in the latter and the atrophy and degeneration of the abdominal organs are merely results of the venous congestion in the inferior vena cava. It is not necessary to assume the existence of any poison to produce these results. The congestion of the lungs leads to splenization; the oedema of the various organs, tissues and cavities is also due to venous congestion and is not of nervous origin. The anaemia of the skin seen in severe beriberi is not due to a contraction of the superficial arteries but is simply a secondary anaemia following the central venous congestion.

(3). The progressive (restorative) changes are seen first in the hypertrophy of the medulla of the adrenals; the enlargement of the lymphatic apparatus and thymus also belongs to this category. In the peripheral nerves and skeletal muscles regenerations of various kinds are frequently observed. The changes in the lymphatics and thymus may be due to a poison; this point requires further investigation.

It cannot be doubted that the various forms of beriberi represent diseased conditions not appreciably distinct from one another, the incidence of the various forms being dependant on the severity and extension of the nerve and muscular changes, since these are the essential lesions in beriberi. In mild cases the nerves and muscles of the less vital parts of the body are affected and therefore the cases may recover, become chronic, or relapse; while in severe cases, owing to the affection of the heart and probably the cardiac nerves, many serious symptoms and corresponding anatomical changes are produced. In all cases the principal changes occur in the peripheral nerves and muscles and belong to the degenerative processes. The various cell infiltrations seen in the nerves and muscles only appear after the disease has lasted some time and must be regarded as reactionary and reparative. In this sense it is justifiable to describe beriberi as a "multiple neuro-muscular degeneration," and from clinical observations and the pathological findings it is probable that the nerves are affected first, that is, the disease is due to primary nerve lesions.

P. W. B-S.

KUSAMA (Shigeru). **Ueber die Veränderungen des Herzens und Gefaess-Systems bei Kakke (Beriberi).**—[Changes in the Heart and Vascular System in Beriberi].—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 383–387.

In the pathology of beriberi characteristic changes are found in the heart and circulatory system; these have been specially studied by the author and other Japanese workers. The size of the heart may be greatly increased; from 93 cases YAMAGIWA obtained one which weighed 368 gms. As is well known hypertrophy, or hypertrophy and dilatation, of the right side is the most marked feature, the myocardium showing fragmentation of the muscle fibres, and hyaline and fatty degeneration, the bundles of Hiss (NAGAYO) being implicated and the intra-mural nerves degenerated. It is from these pathological causes that dilatation so often results. The lungs frequently become chronically indurated and emphysematous, containing much dark blood. The appearance of anaemia is greatly due to the dilatation

of the pulmonary vessels and contraction of the systemic arterioles. Viscosity of the blood is said to exist by some workers but this might be a post-mortem change. Undoubtedly there are marked alterations in the walls of the blood vessels; sclerotic changes in the intima of the aorta and large arteries have been frequently found by NAGAYO, SCHEUBE, etc., and acute degenerations of the femoral artery are described by the author. The symptoms and complications of beriberi are to a great extent explained by these pathological changes in the vessel walls.

P. W. B-S.

LACAVA (Francesco). **Sopra un caso di Beriberi osservato nell' Italia meridionale.**—*Malaria e Malat. d. Paesi Caldi.* 1915. Mar.–Apr. Vol. 6. No. 2. pp. 49–57.

A case of peripheral neuritis occurring in a country woman aged 17, of Ferruzzano Reggio, Calabria, is described in detail. By a process of exclusion no other diagnosis but beriberi was possible. It is noted that the patient preferred polished rice and ate freely of it, which is unusual among the country people.

P. W. B-S.

HIGHET (H. Campbell). **The Sequelae of Beriberi.** *Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 355–358.

In police work in India the author was able to follow up for some years the history and clinical conditions of a number of cases of beriberi which had returned to duty; out of 28 cases he found variation in rhythm of the radial pulse in eleven. Examination of the patella reflexes gave the following results:—

Exaggerated in both legs	3
Marked in both legs	3
Normal in both legs	2
Just present in both legs	5
Absent on one side delayed on other	2
Absent in both	13

There were relapses in five cases in the year following recovery. According to TRAVERS "absolute recovery is the rule," but there is in many cases of apparent recovery continual menace to life.

Death being due to cardiac failure, at post-mortem hypertrophy of the heart and pericardial dropsy are generally found. The cases have an important medico-legal bearing.

P. W. B-S.

CRISÓSTOMO (Edilberto). **Terapeutica del Beriberi por los Compuestos Colestericos (Cerebrina, Paratoxina, Colesterina y Fitosterina).** [The Cure of Beriberi by Cholesterin Compounds].—*Actas. Mem. y Comun. de la 11 Asamblea regional de Med. y Farmaceut. de Filipinas.* 1914. pp. 181–208.

It is a pity that this interesting paper has appeared in such a generally naccessible form. In it the author propounds the theory that the

symptoms of beriberi are not in any way dependent upon the lack of so-called vitamines or phosphorus-compounds in the food, but are due to the low content of cholesterin or similar bodies in the patient's blood. Starting with the observation that hypodermic injections of 3 cc. of cerebrin proved singularly efficacious in promoting sleep in the case of two female lunatics who suffered from insomnia, the author was led to try the effect of the same substance on beriberi patients suffering from neuritis and paraplegia, and according to the cases recorded this was attended with marvellous success. The clinical histories are given of four cases of parturient women and their infants, who were treated in this way with 3 cc. doses of cerebrin injected into the lower limbs of the mother. The benefit extended to such of the suckling infants as were suffering from athrepsia, their mothers being directed to continue nursing instead of weaning them.

From six to ten injections of cerebrin, given on alternate days, generally sufficed to abolish all symptoms with the exception of the loss of patellar reflex. No modification whatever was made in the diet in the way of ordering beans and undecorticated rice, though it is not precisely stated what the patients' diet had been before the supervention of symptoms. Presumably, as they were all natives of the Philippines, ordinary rice entered very largely into their diet. Two further cases of parturient women were then treated in the same way with paratoxin instead of cerebrin with equal success.

Encouraged by such striking results, the author then proceeded to test the effects of cholesterin in the same way. The drug was dissolved in the proportions of 5 per cent. in olive oil, the oil being made up into capsules containing 1 cc. each for the purpose of hypodermic injection. The cases of nine patients, of both sexes, suffering from beriberi, who were treated in this way, are narrated. The cholesterin seems to have acted even better than the cerebrin in previous cases. The author was led to test this substance on the supposition that cholesterin, being a lipoid, although not containing phosphorus, is the active agent in cerebrin. A test was then made of phytosterin in the same way upon six more cases with uniform success, phytosterin being taken as the vegetable equivalent of cholesterin. Finally experiments were made upon five fowls, of which two were retained as controls and fed on ground maize, while the other three were fed on decorticated rice. Symptoms of polyneuritis appeared in all the latter, and were promptly subdued by injections of cholesterin given first daily and then at intervals of two, three or four days, as improvement ensued.

The author terminates his communication with some general observations on the subject of beriberi and its causation, in the sense indicated above.

J. B. N.

Drummond (J. C.) & Funk (C.). **The chemical Investigation of the Phosphotungstate Precipitate from Rice Polishings.**—*Biochem. Jl.* 1914. Vol. 8. pp. 598–615.

This is a very technical paper describing the authors' attempt to isolate the curative substance for beriberi which is known to be present in rice polishings in a pure condition, and also to examine for other

simple nitrogenous substances contained in the phosphotungstic acid precipitate which might be degradation products of the unstable curative substance. 620 kilograms of rice polishings were examined and four fractions were obtained—(1) sublimate fraction, (2) purine fraction, (3) silver nitrate baryta fraction (which contained the active substance) and (4) residual phosphotungstic acid fraction. Considerable amounts of choline and nicotinic acid, with small quantities of betain, adenine, guanine and possibly guanidine were demonstrated. Attempts to confirm the work of SUZUKE, SHEMAMURA and ODAKE, who claimed to have isolated the curative substance in the form of a picrate, were not successful, and the authors were themselves unable to isolate the curative substance which occurs in rice polishings, this being apparently decomposed during the fractionation.

[An explanation of the loss of the curative substance in the process is given by FRASER and STANTON, see below.]

P. W. B-S.

FRASER (HENRY) & STANTON (A. T.). **The Chemistry of Rice Polishings.**—*Lancet.* 1915. May 15. pp. 1021–1022.

Since 1911 the authors have consistently stated that the active substances in rice polishings, which prevent beriberi, are soluble in alcohol and decomposed by sodium hydrate. Others have attempted to obtain the active agents using baryta in the process, with only partial success. The reasons of these failures are explained by four series of experiments which were carried out on fowls. Six fowls were fed on polished rice with, once daily, the alcohol equivalent of 5 grams of rice polishings; these birds all gained weight. Six were fed on polished rice with once daily the precipitate of the alcoholic extract of 5 grams of rice polishings which had been thrown down by 0·3 per cent. sodium hydrate; these lost weight rapidly. Six were fed similarly but the filtrate was neutralised and evaporated at a low temperature, the equivalent of the non-precipitable material of 5 grams being given daily. These fowls also lost weight. A fourth series received the filtrated substances which had been more completely thrown down by 0·5 per cent. sodium hydrate; most of these rapidly developed polyneuritis.

These experiments proved that sodium hydrate in weak solutions destroys the active substances contained in the alcoholic extract of the rice polishings. FUNK in 1912 believed that he had isolated the active agents (Vitamine) from the rice polishings by fractional distilation, using baryta water. In a later paper with DRUMMOND it is stated that he has so far failed to isolate the curative substance. This the authors attribute to their using barium hydrate in the process, which decomposes the active substance. "Vitamine" as a distinct entity has therefore yet to be discovered.

P. W. B-S.

RAMOINO (Paolo). **Contributo allo studio delle alimentazioni incomplete. Nota II.—Ricerche sul ricambio gazoso nelle alimentazioni con riso.**—*Pathologica.* 1915. Mar. 1. Vol. 7. No. 152. pp. 101–110. With 7 text figs.

Four pigeons were experimented upon, to show the evidences of metabolism through the respiratory exchanges, while fed on ordinary

grain, polished rice, and polished rice with bran extracts. A very ingenious apparatus was devised, and is figured, to register the oxygen used and the CO_2 expired. These together with the weight and other details are accurately set out in a tabular form for each experiment, which lasted for several weeks. On the ordinary grain food the birds kept an average weight. The oxygen consumed and the CO_2 given out remained fairly even; the latter are shown here as $\frac{CO_2}{O_2}$ (about 1·0). After the bird was put on polished rice this figure steadily fell but was particularly marked about the time of the onset of the neuritic symptoms, falling to about half the normal just before death $\frac{CO_2}{O_2}$ = ·51.

In experiment 3, after the bird had developed marked neuritic symptoms and the CO_2: O_2 coefficient had fallen to ·53, treatment with bran extract caused a rapid and marked improvement, the coefficient rising at once to ·80 but falling again when the remedy was omitted and the bird died. There are several characteristic figures of the birds in spastic paralytic attitudes.

P. W. B-S.

SAKAI (S.) & HIRAMATSU (T.). **Ueber die vasokonstriktorische Wirkung des Serums von Kakke-Kranken auf die überlebenden Froschgefässe.** [The Vasoconstrictor Action of the Serum of Beriberi Patients on the Frog's Arteries].—*Mitteil. a. d. med. Fakultät d. Kais. Univ. z. Tokyo.* 1914. Vol. 13. No. 1. pp. 177–196.

The authors made a number of experiments on toads (frogs not being obtainable in Tokyo), to determine whether the serum of beriberi cases had a constricting action on the small arteries, and incidentally several other debated points relating to the subject. O'CONNOR recently has shown that though serum has this action, plasma has not, except when obtained from the perirenal veins, which contain some adrenalin, and (2) that the active substances are produced during the coagulation of the blood. SHIMAZONO showed that the serum and even oedematous fluid of beriberi cases act upon the eyes of frogs. The author examined the activity of the serum and plasma of 93 cases of beriberi, also a case of nephritis, Addison's disease, Graves' disease, and diabetes insipidus. The technique is minutely described and the results are set out in a number of tables which are full of detail. The conclusions may be shortly stated thus. The serum of all cases of beriberi has some vaso-constrictive action on semi-devitalised frog tissue (the vessels are washed through with Ringer's solution for two hours before the test fluid is used, to avoid irregular contractions), its action is strongest in the progressive stages of the disease, and it has some relationship to the number of blood platelets present; the plasma being inert in comparison with the serum. The serum of Graves' disease is also active, that of nephritis, Addison's disease, and diabetes insipidus having no such effect on the vessels. The author states that in his opinion these vaso-constrictive substances found in beriberi blood-serum are but an exaggeration of those found in normal blood serum, and that it is very improbable that any substances acting specially on the vessels are elaborated in beriberi. He further states that shortly he will publish some work on the properties of these substances.

P. W. B-S.

TASAWA (R.). **Experimentelle Polyneuritis besonders bei Vögeln, im Vergleich zur Beriberi des Menschen.** [Experimental Polyneuritis in Birds compared with Beriberi in Man].—*Zeitschr. f. exper. Path. u. Therap.* 1915. Jan. 2. Vol. 17. No. 1. pp. 27–46.

The author commences by stating that the two diseases are not the same. He upholds FUNK's theory that bird beriberi is due to a lack of vitamines and is not due to any autogenous or exogenous poison. He states that the only points of resemblance between bird beriberi and human beriberi are the degenerative changes in the peripheral nerves and muscles and the resulting paretic symptoms. Though rice is the staple diet in Japan and therefore the conditions are more or less analogous to those of the bird disease, the author from his observations in many epidemics among fishing men and in the coastal districts is unable to accept the conclusion that deficiency in vitamines is the cause of beriberi. He states that conditions with regard to diet, work, habits of life, age, sex, climate, duration of voyage, etc. always appear to be the same, yet beriberi occurs only in certain places and usually as a regular epidemic. In some years it has a high mortality, in others a low; as a rule only certain groups are attacked while others around remain unaffected and often those receiving subsidiary diet, as beans, fish, etc. are not less, but as highly affected.

From these observations he concludes that "disposition" plays an important role. In Tokio hospital it is not uncommon for the sick to develop beriberi as an intercurrent disease and to recover without change of diet under symptomatic treatment. Though the polyneuritis of birds is very easily cured by the alcoholic fat-free extract of rice bran this, in the author's experience, even when given in large quantities, produces no result in human beriberi. The early emaciation found in the bird and experimental animal disease is very markedly different from that found in epidemic human beriberi. The author however does not deny that polished rice as a chief article of diet may have a connection with an outbreak of beriberi by creating a "disposition" for the disease, but that it is the cause of beriberi he cannot accept. He however recognises that there are human cases which are due to lack of vitamines and similar to the experimentally produced disease, such as the "rice food disease" of infants (quite distinct from infantile beriberi) and probably the sailing ship beriberi of NOCHT. The disease which MOSZKOWSKI produced in himself by subsisting for 230 days on a diet consisting almost entirely of polished rice was probably nothing more than "rice food disease" in an adult and quite different from true beriberi, as the symptoms disappeared in a few days after treatment with rice bran extract.

[Though the deficiency theory of beriberi is not accepted by the author it is recognised to be partly responsible, and wholly causative of the very similar conditions with which it is so closely connected. DARLING and others have shown how gradations from scurvy to beriberi can be traced by clinical and pathological evidences, the whole coming under the deficiency group of diseases. See this *Bulletin*, Vol. 5, p. 107.]

P. W. B-S.

UNDULANT FEVER.

BASSETT-SMITH (P. W.). **Recent Research relating to Undulant or Mediterranean Fever.** *Jl. R. Naval Med. Serv.* 1915. Apr. Vol. 1. No. 2. pp. 166–180. With 1 map and 2 diagrams.

This interesting paper provides a very complete summary of what has become known as regards undulant fever since 1906, the year in which the Royal Society's Commission presented a final report upon its etiology. It is furnished with a map of the world showing the distribution of the disease and with diagrams (*see* p. 158) comparing its incidence in Malta amongst the Army and Navy and civil population respectively, between the years 1905 and 1912.

After some notes upon the question of nomenclature, and a discussion of the geographical distribution of undulant fever, the author explains the ancestery of the Maltese goat, which is a modified species of the Thebian or Egyptian goat owning *Capra hircus* as its parent stock. He points out that so much is said about infection through drinking goats' milk that there is a danger of forgetting the fact that other ruminants may carry the disease. Further on he notes that in addition to man and the goat, cows, sheep, horses, mules and dogs are liable to natural infection.

It is now known that the *Micrococcus melitensis* possesses very considerable vitality outside the body and, while an infected milk supply is undoubtedly the chief source of the disease, the view that other methods of infection frequently play a part is steadily gaining ground.

As SÉJOURNANT has indicated, while in urban areas infected milk is generally to blame, in rural districts the disease is generally spread by direct infection or inoculation of infected soil or milk.

In Corsica, as LEGER has shown, goats may infect dogs and goatmen, women who milk the goat become infected through the hands, and cheese made from the milk and eaten fresh is also a source of infection, for in it the micro-organism can retain its vitality for fourteen days. [This has also been observed in Southern France.]

The part played by ambulant human cases must not be forgotten, the micrococcus being voided in the urine and so affecting soil and outhouses and conveying the disease to those employed in the latter.

Food, fingers and flies are to be considered as possible carriers of the organism. Bassett-Smith believes the latter to be a true coccus though it presents varying appearances under cultural conditions. In old cultures bacillary forms are common and are due to involution.

The infection of laboratory animals is duly considered, the fact that inoculated rabbits do not suffer from a septicaemia being noted, and then the author has something to say on the *paramelitensis* of NÈGRE and RAYNAUD. In this connection he cites the well-known Hyères case which he published in 1913. [See this *Bulletin*, Vol. 1, p. 579.]

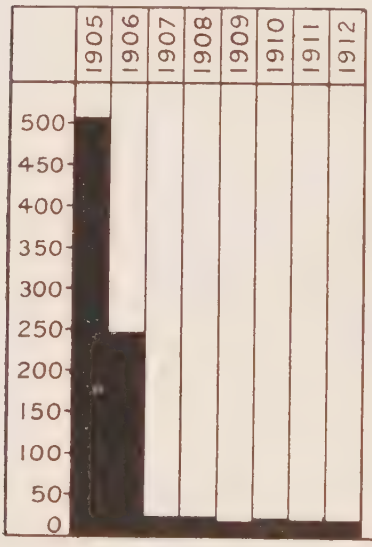
Methods of diagnosis are next dealt with, and the lacto-reaction mentioned. Recent work tends to show that in many of the infected goats there is a localization of the organism producing a mammitis without general septicaemia.

Distribution of Undulant Fever.

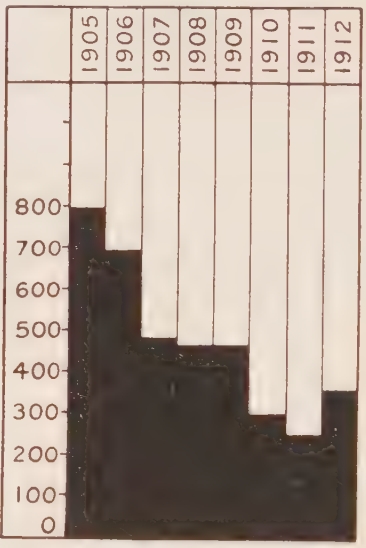
The lacto-reaction used for detecting infected goats, though not always reliable and not to be depended upon alone for prophylactic purposes, is of very great assistance to the sanitary officer, but the occurrence of anomalous reactions must be borne in mind.

At the same time the reaction is a specific one and it is very important to discover the causes of error. Cows' milk in some cases has a tendency to agglutinate the *M. melitensis*, but if certain precautions are taken most of the non-specific reactions may be avoided. The author insists upon the necessity of centrifuging the milk very thoroughly, or using whey; also of heating it for half an hour at 60° C.

In man the diagnostic tests in order of their relative value are:—(1) Sero-culture; (2) agglutination; (3) complement fixation; (4) precipitin test; (5) culture of the organism from the urine.



Army and Navy.



Civil Population, Malta.

It is to be noted that in advanced cachetic conditions blood culture will often fail.

The agglutination reaction is considered at some length, and the following rules are given for its technique.

(1) The culture to be used should be proved to be active with known specific sera and should not agglutinate with other sera. A paramelitensis strain would fail to agglutinate in high dilutions with a true undulant fever serum and give rise to a negative error.

(2) As recommended by Nègre and Raynaud, the heated and unheated serum should be tested, the former cutting out the non-specific agglutinins and preventing a positive error in non-undulant cases.

(3) The test should always be carried to high dilutions, up to 1 in 400, to avoid paradoxical reactions.

The differential diagnosis from a clinical standpoint is often difficult, more especially in the case of young children. As regards treatment, Bassett-Smith says he has found yeast of value. It increases the

polymorphs and reduces the tendency to neuritis which is a feature of the later stages of the fever.

SCORDO's method of treating goats with intravenous injections of perchloride of mercury may be found applicable to human cases. It increases the red cells, haemoglobin and polymorphs, and sterilizes the blood, thus cutting short the fever.

Salvarsan and protargol have been used, and so has a serum obtained from goats inoculated with a nucleo-proteid derived from *M. melitensis*. NÈGRE and SERGENT have had good results with a polyvalent serum, while vaccine are often useful, especially in sub-acute cases. The author suggests the use of polyvalent and of sensitized vaccines and brings a most useful summary to a close with a few remarks on general prophylaxis and on the necessity for a thorough disinfection of excreta and contaminated articles in all cases, whether ambulant or otherwise.

A. Balfour.

BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIENE PUBLIQUE. 1915. Feb. Vol. 7. No. 2. pp. 255–299; Mar. No. 3. pp. 485–501.—**Fièvre Ondulante.** i. By JORGE (Ricardo); ii. By SARGENT (Edm.) & NEGRE (L.); iii. By DE COTTES (J. Duran); iv. By SANTOLIQUIDO; v. By NICOLLE (Ch.).

i. JORGE (Ricardo). **Rapporte présenté dans la Session d'avril 1914 du Comité de l'Office Intern. d'Hyg. publique.**

In this long paper the author first describes the wide geographical distribution of the disease. He then gives an historical account of its presence in Portugal. In 1910, chiefly through the labours of BETTENCOURT, it was recognised as being endemic in the country. A coordinated effort was made to find out the most affected parts, and the epidemiological characters, but at first the general practitioners had to be instructed in the clinical characters of the disease, and means of obtaining laboratory diagnosis given to them. It was found that in Estremadura, including Lisbon, there was a large centre and that there were other less affected areas both in north and south. It was evident that the disease had frequently been mistaken for typhoid or malaria, but peculiar fevers had long been recognised and were called by various names, as sweating typhoid, year fever, etc. The seasonal incidence was most from April to October. Throughout Portugal goats are abundant and their milk is used both in the towns and country. The manufacture of cheese, eaten more or less fresh, is a great industry, and through the milk and its products a very great proportion of the infection could be traced. The infected goats are not so much the imported as the indigenous animals. The author however is convinced that infection is not always by ingestion of infected milk and food, but in a proportion of cases is by contact and inoculation methods, and also that man to man infection is fairly frequent. Complete sanitary methods as well as control of the animals are of the utmost importance to prevent the disease spreading. The paper concludes with a bacteriological report by BETTENCOURT on the methods of diagnosis employed for both men and animals, which does not contain any new matter.

ii. SERGENT (Edm.) & NÈGRE (L.). **La Fièvre Ondulante in Algérie.**—*Ibid.* Mar. No. 3. pp. 476–484.

The disease has been known clinically in Algeria since 1895 and was demonstrated bacteriologically in 1904. In 1907 Edm. SERGENT, GILLOT and LEMAIRE studied the infection in the native goats, finding 4·2 per cent. affected. In 1911 NÈGRE and RAYNAUD established the existence of the *M. paramelitensis*, which is probably the same as that called by SERGENT and GILLOT in 1907, *M. pseudo-melitensis.* From the morphological characters it is possible to differentiate strains which are always true cocci from others which are distinctly cocco-bacilli in form. It was shown that some of the infected goats reacted to the *M. melitensis*, others to the *M. paramelitensis*, infection being less common among the Algerian than among the goats of Malta (10 to 50 per cent.), and that the infection is less intense and less lasting among the native goats. Horses, mules, donkeys, and dogs were sometimes infected. The disease spreads through the milk, goat's or human, either by ingestion or by contact. Much stress is laid on the dissemination of the microbe by *dirty hands infecting milk, cheese, and cream.* The goats themselves become infected from their unsanitary surroundings, contaminated by urine, etc. There is no doubt that the disease was brought to Algeria by goats from Malta and Gibraltar. In 1908 the importation of all ruminants from Malta was stopped and since that time the disease has been much less prevalent, but this diminution did not take place in the province of Oran owing to the importation there of infected Spanish goats.

[The morphological differences found in cultures of the *M. melitensis* must be familiar to all who have worked much with these organisms.]

iii. DURAN DE COTTES (J.). **La fièvre ondulante en Espagne.**—*Ibid.* pp. 485–492.

It is uncertain at what date undulant fever first appeared in Spain, certainly more than 100 years ago. In 1902 it was definitely recognised in Barcelona and in 1905 was carefully studied by RAMON y CAJAL. The existence of this fever was probably fairly widespread at that time but few recognised it as such, calling it by other names. It was however most commonly found in places on the coast and was due to infected goats imported from Malta. These animals were greatly prized in Spain for their milking qualities, and though they had been interdicted in Gibraltar they have passed freely up into the country. Infected goats have been found by the author in almost all the provinces and with these human cases always exist. In man the mortality is about 8 per cent. Among the diagnostic measures recommended by the author as of great value is the subcutaneous injection of dead vaccines. The serum and vaccine treatment of the disease is rather fully described, the former being best for acute cases with toxic symptoms, the latter in the more chronic stages.

iv. SANTOLIQUIDO. **L'Administration sanitaire Italienne sur la fièvre ondulante.**—*Ibid.* pp. 493–497.

The disease is most common in Southern Italy and in Sicily and though it does not cause many deaths it occasions much loss of

time to the working population. It is stated that in Tripoli 35 per cent. of the goats are infected and in Southern Italy 15 per cent. of the cows. Though the use of infected milk is a common cause, the author is convinced that interhuman infection is very important and he quotes the epidemics at Stiava and d'Alghero in support of this view. Milk, excreta, urine, and secretions generally are the sources of infection, widely distributed by unsanitary dwellings and surroundings, the germ obtaining entrance by the digestive, respiratory, cutaneous, conjunctival, or genital routes, most commonly by the former.

v. Nicolle (Ch.). **Exposé resumé des travaux de l'Institut Pasteur de Tunis sur la fièvre mediterranéenne.**—*Ibid.* pp. 498–501.

On taking up the directorship of the Institute the author first had to demonstrate the presence of undulant fever in Tunis. When this was done the various diagnostic methods, particularly those relating to agglutinins, were carefully worked out and precise rules were laid down to avoid errors from many causes; these are now well known. A total of 2,600 goats was systematically examined; of these 4 per cent. were found to be infected, those from Malta four times more often than the indigenous ones. The Government therefore stopped the importation of animals from Malta. Various experiments were carried out to show the susceptibility of various domestic and other animals. A serum was prepared which has a marked curative action, cutting short the disease when used in an early stage of the fever; this has been supplemented by vaccines also prepared in the Laboratory. The author finally emphasises the great danger to experimenters working with the micrococcus, no less than four persons having contracted the fever through manipulations in his laboratory.

[This has been experienced in almost every laboratory.]

P. W. Bassett-Smith.

Cantieri (Collatino). **La sieroterapia della febbre mediterranea.**—*Riv. Crit. Clin. Med.* 1915. Vol. 16.

May 8.	No. 19.	pp. 289–295.	With 2 charts.
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The extension of undulant fever in Italy is shortly dealt with, but the main part of this paper is occupied by a description of the therapeutic action of the serum of Trambusti-Donzello, brought forward in 1910. Twenty cases previously treated by various authorities are shortly described, the results in most of the cases being good; the quantities employed varied from 5 to 60 cc., the usual dose being from 5 to 10 cc. given at intervals of two, three, or five days. The author describes in detail fifteen cases of his own treated with the serum. These were of different degrees of severity and duration, as seen by the temperature charts given; the initial injections were employed as early as the tenth day in one case, and after two years in another. At first he used 10 to 20 cc., but later higher doses were given, up to 40 cc. In ten out of the fifteen cases treated the total amount used varied from 60 to 150 cc. Generally speaking, the earlier

the treatment the more effective, and the longer the case the more serum required. The inoculations were given at short intervals and were then stopped, but with relapses of the fever they had to be renewed and anaphylactic reactions occurred in several cases: for instance, in case 6 after the patient had received 70 cc. of serum and thirteen days after the first series, when the symptoms were severe. Some of the reasons for unsuccessful results are, absence of sufficient complement in the serum of the patient to combine with the amboceptor in the serum, insufficient quantity of serum for the dose, and irregular spacing of the doses, and possibly the quality of the serum as supplied for use.

The conclusions given are—

1. The serum can be recommended for all cases of undulant fever unless specially contraindicated.
2. The amount given should be large, 60 to 80 cc. in twenty-four hours.
3. The treatment will gradually reduce the temperature but after a sub-febrile period a new cycle may develop. The doses should follow one another *quickly*, equal or slightly smaller in size than the initial one; then good reactions will probably be produced. The anaphylactic phenomena require further detailed study in the laboratory.

[In a disease running such a variable course as undulant fever it is very difficult to determine with certainty whether the therapeutic agent has really been effective. A study of the cases and temperature charts reported does not strongly favour this method of treatment and the danger of anaphylactic reactions is a serious drawback.]

P. W. B-S.

VIRGILLO (Francesco). **Un nuovo metodo per la reazione agglutinante del latte delle capre infette di micrococco melitense.** [A new method for the agglutination reaction in the milk of goats infected with *M. melitensis*].—*Pathologica.* 1915. Mar. 1. Vol. 7. No. 152. pp. 116–120.

The various methods of ZAMMIT, PULVIRENTI, PISANI-SANTI, and CANTIERI, for determining the specific agglutinations of the *Micrococcus melitensis* in milk are described; of these that of ZAMMIT is most commonly used, being the more easily applied; it is, however, far from perfect. The author's method is a combination of precipitation and agglutination and though it is more difficult to carry out the results agree more closely with the blood serum tests. The serum for the precipiting is obtained by immunising a rabbit with intra-peritonal inoculations of goats' milk which has been autoclaved for one hour on two days, the inoculations of 12 to 24 cc. being given every second day. The milk to be tested is divided into two parts, one part for the ZAMMIT's test and one for the precipitin method. For the latter the following proportions are used—0·5 rabbits serum, 0·1 milk, and 0·2 water; the results are read off the next day. The clear fluid free from casein is then used for the agglutination test in dilutions of 1 in 10, 1 in 20, 1 in 50 with an emulsion of the *M. melitensis*; the mixtures are put up in capillary tubes and the results read off in 24 hours. Using an

artificially immunised goat the results were found to agree very closely with the serum tests, but both showed marked variations from day to day. Thirty samples of goats' milk were examined by this method and by ZAMMIT's; in 17 the results were in agreement. In his conclusions the author admits that his method is more laborious, but he claims for it that there are fewer errors and that the results are more easily interpreted.

P. W. B-S.

VIRGILLO (Francesco). **La reazione agglutinante del sangue nella infezione melitense.**—*Policlinico.* Sez. Prat. 1915. May 2. Vol. 22. No. 18. pp. 589–594.

The contradictory results in the diagnosis of undulant fever with agglutination tests and the presence of positive reactions in tubercular and other infective conditions, which have frequently been reported, caused the author to make some personal observations.

He quotes two cases of undoubled undulant fever, in both of which in the early period of the disease agglutination up to 1/1000 was obtained, and after two years in the first and four years in the second case the serum still reacted positively at 1/100 but not 1/200. These low reactions he considers non-specific. He states that for accurate diagnosis the amount of agglutination oscillates between 1/200 and 1/500 and that lower dilutions are unreliable.

[A large number of references are given, all but two of which are prior to 1912. There is no mention of the observations of NÈGRI and others, which show that the non-specific agglutinins are to a great extent cut out by heating the serum to 57° C. for half-an-hour.]

P. W. B-S.

LUCIBELLI (G.). **Contributo allo Studio sulla Virulenza del *Micrococcus melitensis*.**—*Riforma Med.* 1914. Sept. Vol. 30. No. 36. pp. 988–991.

A short historical account of the etiological factors which favour the diffusion of undulant fever is given. It is pointed out that the vitality and virulence of different strains of the micrococcus vary considerably and that the virulence can be exalted by passage and lowered by culture in the laboratory. The author carried out a number of experiments with rabbits by inoculating them intraperitoneally with a strain recently isolated. From these he drew the following conclusions:—The *M. melitensis* acquires a high degree of virulence when cultivated in goat's milk. The virulence is preserved by passage through experimental animals, but not for long. The addition of 2, 4, or 6 per cent. of the milk to media does not increase the virulence. Cow's milk has not the same property as goat's milk. Other organisms as *B. typhosus*, *B. coli* and *M. para-melitensis* do not alter in virulence when cultivated in goat's milk. It is possible that by the use of goat milk cultures and animal inoculations a high degree of immunization might be obtained.

[The experiments are interesting but are too few in number to ground conclusions on, and they do not appear to have been repeated. The rabbits died in *12–14 hours* after inoculation with milk cultures and a first blood culture; but survived when inoculated with a broth subcultured from the original broth culture, and when inoculated with a goat milk culture of *M. para-melitensis*. No mention is made of EYRE's work on exaltation of virulence by intra-cerebral inoculation.]

P. W. B-S.

de NUNNO (R.). **Ueber die Wirkung des Mikkrokokkus von Bruce (Melitensis) und seiner Toxine auf das periphere und zentrale Nervers system.** [The Action of the Micrococcus of Bruce (Melitensis) and its Toxins on the Central and Peripheral Nervous Systems.]—*Deut. Arch. f. Klin. Med.* 1914. Vol. 116. No. 304. pp. 275–294. With 4 plates.

The author gives an historical survey of the disease, in which he points out that very little has been done to investigate the effect of the *M. melitensis* and its toxin on the nervous system. He therefore decided to study the nervous system in the disease. He experimented on rabbits of equal weight, with various strains of the organism which were not very virulent; the cultures were injected either alive or dead, under the dura, intravenously, or into the cord. He gives a detailed account of the results obtained in three rabbits, one injected with a living culture under the dura, another with double the amount of living culture intravenously, and the third with a dead culture under the dura. The effects were more or less similar. After subdural injections of living cultures, changes developed in the vascular tissue—hyperaemia, degeneration of the vessel walls and tendency to thrombus formation; in the central nervous system he found a decrease in the number or injury to the nerve cells with loss of mitochondria, chromatolysis, karyolysis, pyknosis, atrophy and breaking up of nerve febrils and reticulum, with a leucocyte infiltration. These changes were most marked in the cerebrum and medulla, less evident in the cord, and entirely absent in the cerebellum and peripheral nerves. After intravenous injections the changes were similar, but the damage was greatest in the medulla and cord, the peripheral nerves were also severely affected, the cerebellum was not affected. With subdural injections of sterilised cultures (namely of endotoxins) the same changes were found but they were most marked near the site of injection.

From these experiments it is evident that lesions of the central and peripheral nervous systems can be experimentally produced by the *M. melitensis*. As the injected organisms were of low virulence they produced a protracted disease inducing changes in the nervous system approximately similar to those found in man. Injections into the brain did not show any marked pathological power as the animals survived for a long time and showed generally a chronic course of the disease; this is in accordance with clinical observations that in man nervous symptoms are comparatively rare. On the other hand the histological changes found explain why neuritis is so common, depending

upon the destructive action of the *M. melitensis* on the peripheral nerves. The damage to the medulla shown experimentally also explains and confirms the observations of bulbar symptoms made by Grocco. The experiments also show that a great part of the damage is due to the toxins, since the dead cultures produced the same changes as the living cultures. There is therefore no doubt that the *M. melitensis* can cause marked nervous disturbances, and that the nervous symptoms are based upon special and not infrequently severe anatomical changes in the central and peripheral nervous systems.

P. W. B-S.

SLEEPING SICKNESS.

Da Costa (B. F. Bruto), Sant'Anna (J. Firmino), Dos Santos (A. Correia) & Alvares (M. G. de Araujo). **Relatorio Final da Missao da Doença do Sôno da Ilho do Principe (1912-1914).** [Final Report of the Sleeping Sickness Commission of the Island of Principe].—*Arquivos de Hig. e Patol. Exot.* 1915. Mar. 30. Vol. 5. 262 pp. With 3 maps, 7 plates & 68 figs.

This interesting volume contains the final report of the Commission which has succeeded, at any rate for the moment, in completely suppressing sleeping sickness in the Portuguese island of Principe, off the West Coast of Africa.

Principe is one of two islands which lie in fairly close proximity to one another, the second one being San Thomé, where sleeping sickness has never prevailed. They are both given up to the cultivation of cocoa, and the ravages made at one time by sleeping sickness in Principe threatened to bring the industry to an end. Principe measures about 17 kilometres from north to south and about 10 kilometres from east to west, its total area being about 126 square kilometres. It is distant about 200 kilometres from the coast of Africa and 130 kilometres from the sister island of San Thomé. Both islands are volcanic in formation, and have a tropical climate, Principe being situated only 1·4 degrees north of the equator. As is shown in the illustrations attached to the report, the southern portion of Principe is mountainous and in this region sleeping sickness has never prevailed. North of the mountain chain, however, the land falls gradually to the sea levels and is everywhere covered with tropical forest intersected with rivers, except where the ground has been cleared for cultivation. The majority of the streams take their rise in swamps, and run through tunnels of vegetation to the sea. It is along these streams and on the borders of the sea adjoining their mouths that the *Glossina palpalis* is, or was to be found, its distribution being clearly indicated on a map.

Principe in former times was a depot for the slave trade, the slaves being generally brought in boats from the nearest point of the continent and landed on the north side of the island. Imported cattle were also landed at the same point. Sleeping sickness is supposed to have been imported into Principe about the year 1825, the Glossina having travelled along with the slaves and the cattle from the mainland. San Thomé, not having been used in the same way as a depot, escaped the disease. The total population of Principe in the year 1902 amounted to just over 4,000 inhabitants, but as a result of the ravages of sleeping sickness, the population had fallen by the year 1907 to 3,000 only, in spite of the continued importation of labourers from the mainland. The general mortality for the first of these years amounted to 221 per thousand, of which sleeping sickness accounted for 61 per thousand, or nearly one-third. In 1906 the general mortality amounted to 196 per thousand, and that from sleeping sickness to 83 per thousand, being an even higher proportion. It is not wonderful that the cocoa industry of the island was menaced with extinction.

Various scientific and medical commissions were appointed and duly reported, but it was not for some years that the problem could be properly tackled, for want of both means and labour. Eventually a corps of labourers was formed from prisoners brought from San Thomé and from the mainland, and by means of moveable camps a system of clearing and drainage was instituted throughout the island, combined with a fly-catching crusade against the Glossina by means of bird-lime. The result has been, as is shown in Map III, the complete extermination of the fly. At the same time the whole of the inhabitants of the island, whose number had risen again by 1913 to nearly 5,000, were subjected to periodical blood examinations once in every three months, and every infected individual was at once segregated in hospital and treated with atoxyl.

An interesting feature in the case of Principe was the existence in the island of a large number of wild pigs, originally liberated by the settlers, whose distribution in the woods closely corresponded with that of the fly. Evidently these animals, along with a number of wild dogs, were the principal reservoirs of the trypanosome, and had to be destroyed. The indigenous fauna of Principe is limited in character, and consists of one species of monkey (*Cercopithecus mona*), a civet cat (*Viverra civeta*), field rats and house mice, and frugivorous and insectivorous bats, besides the usual assortment of tropical birds and reptiles; and the opportunity was taken of thinning considerably the numbers of civet cats and monkeys, in the interests of the cultivators, at the time of the forays against the dogs and pigs.

For the purpose of catching the flies, ten men out of every hundred of the brigade of workers were specially dressed in white clothes with a suitable headgear. They carried on their backs a square of dark coloured cloth which was spread with bird-lime, and they were set to walk about in twos in the clearings, so that each man might pick off the leaves that stuck to his companion's back. The most delicate men of the gangs were set to this task. At the end of the day the flies caught were detached from the cloths, counted and burnt. As has been shown in a table already published in this *Bulletin* (Vol. 4, p. 354) the total number of flies thus caught in the three years 1911, 1912 and 1913 amounted to nearly 470,000. The bird-lime used was at first manufactured locally and was composed of a mixture of palm-oil and resin, which had the inconvenience of drying rapidly; and it was eventually replaced by a supply from England, one of the best samples for the purpose being that manufactured by Messrs. Tunbridge and Wright, of Reading.

Space will not permit of a further analysis of this complete and valuable report.

J. B. Nias.

Dubois (A.) & van den Branden (F.). **La réaction de Boveri dans la Trypanosomiase humaine.**—*Bull. Soc. Path. Exot.* 1915. May. Vol. 8. No. 5. pp. 261–266.

A description of the reaction is given.* One cc. of the cerebrospinal fluid to be examined is placed in a small test tube and then 1 cc. of

* See *Münchener medizinische Wochenschrift.* 1914. June 2. p. 1215.

a 1 per cent. solution of potassium permanganate is run slowly down the side of the inclined tube so that the column of violet coloured permanganate remains on the top of the cerebrospinal fluid when the tube is subsequently held vertically. In pathological cases the fluid at the junction of the two columns becomes more or less yellow. This "zonal" reaction is however less well marked than the "global" reaction which is obtained by shaking the tube so that the fluids mix. When the reaction is positive the colour changes from violet to yellow in some seconds or minutes. The value of the reaction is proportional to its rapidity. It is marked when it appears in less than 2 minutes, moderate in 3 or 4 minutes and feeble in 5 or 6 minutes. Beyond these limits it is negative, as all cerebrospinal fluids will reduce permanganate in time.

The author examined the "reaction global" in 62 cases—the "reaction zonal" is less satisfactory and was negative in almost every instance. The results are given in two tables. In the 21 cases recorded in the first table the amount of albumin and the relative number of lymphocytes are also given, whilst in the 41 cases mentioned in the second table the degree of lymphocytosis only was determined.

It was found that of the 21 cerebrospinal fluids which contained more than 100 lymphocytes per cmm., 20 reduced the permanganate rapidly whilst in the other the reaction was moderate; of the 8 which contained between 50 and 100 lymphocytes per cmm., 2 gave a strong reaction, 4 a moderate reaction and 2 a feeble reaction. In the 17 instances where the amount of albumin reached ·40 per 1,000 the reaction was strong in 12 cases and moderate in the remaining 5, whilst in the 4 instances where the amount of albumin was less than ·40 per 1,000 the reaction was never rapid.

A number of observations were made to determine what element in the cerebrospinal fluid caused the reaction. The lymphocytes obtained from the cerebrospinal fluid by centrifugation did not cause reduction of the permanganate, neither did the red cells which are sometimes present through the unavoidable injury of a vessel. On the other hand various albuminous fluids such as egg white, Witte's peptone and human serum gave the reaction. The conclusions are :—

1. The reaction of Boveri is given by sleeping sickness patients in the nervous stage of the disease.

2. It is usually absent or but slightly marked in the first stage of the disease.

3. It appears to be due to the presence of proteids and perhaps to them alone.

W. Yorke.

AUBERT (P.). **Essais de traitement de la trypanosomiase humaine par les dérivés du Diaminoarsénobenzène O_1 et OK_1.**—*Bull. Soc. Path. Exot.* 1915. Apr. Vol. 8. No. 4. pp. 169–172.

Reference is made to previous work [see this *Bulletin*, Vol. 4, p. 258 and Vol. 5, p. 297] on the therapeutic activity of the two derivatives of diaminoarsenobenzene O_1 and OK_1, wherein it was shown that these products possess at least as great a trypanocidal power as arsenophenylglycin and that they are more stable and less toxic.

In the present paper the value of the drugs in human trypanosomiasis is examined. The products were dissolved in sterile distilled water, the strength of the solutions used varied between 1 in 30 and 1 in 40 ; as a general rule the solutions after filtration were injected intravenously. In a limited number of cases the drugs were given subcutaneously or intramuscularly ; no local reactions comparable in intensity with those provoked by arsenophenylglycin were observed. Owing to their relatively great stability it was found possible to use the contents of ampoules which had been opened for several days and simply closed by a rubber plug. The dose administered was ·02 gm. to ·025 gm. per kilo of body weight.

Marked intolerance to the products—more especially to O_1—was observed in certain of the patients; the symptoms, which became manifest either at the moment of injection or at any time up to some hours after injection, were bilious vomiting and a bilious diarrhoea which persisted for several days, a slowing of the pulse, profuse sweats and sharp pains in the epigastrium.

Details of the treatment of 23 patients with O_1 and 20 with OK_1 are given in tables. Both drugs caused the speedy disappearance of trypanosomes from the glands and peripheral circulation. Large glands subsided in some days under the influence of a single dose whilst in one case, in which was considerable hypertrophy of the spleen, there was complete regression of the organ in about a week. Increased frequency of the pulse rate was not observed in patients treated with these products as is usually the case in patients who have received atoxyl ; in this respect O_1 and OK_1 resembles arsenophenylglycin and salvarsan. The derivatives O_1 and OK_1 appear to have the same therapeutic activities, but prolonged observation and multiplication of the cases treated must decide whether the drugs are of real value in the treatment of sleeping sickness.

W. Y.

van Saceghem (R.). **Expériences sur le traitement des trypanosomiases animals. Appendice—L'Émétique en injection intramusculaire dans le traitement des trypanosomiases animales.**—*Bull. Soc. Path. Exot.* 1915. May. Vol. 8. No. 5. pp. 339–348.

At the Brussels School of Tropical Medicine the author carried out various experiments on the therapeutic action of atoxyl and emetic on infections caused by *T. congolense* and by *T. brucei* (Uganda).

Two guinea-pigs infected with *T. congolense* were treated, the one with emetic and the other with atoxyl ; similarly two others infected with *T. brucei* (Uganda) were treated respectively with emetic and atoxyl. The drugs were administered subcutaneously ; details of the dosage and of the results of examination of the peripheral blood are given. From these four experiments the author concludes that neither emetic nor atoxyl is of any real value in the treatment of infections caused by *T. congolense* and *T. ugandae.*

In the next series of experiments five guinea-pigs—two infected with *T. congolense* and three with *T. ugandae* were treated with both drugs combined, atoxyl-emetic ; details are set forth in tables. One guinea-pig infected with *T. congolense* was cured by a single injection of the combined drugs ; the other animal had three relapses before

the cure was completed; after each relapse an injection of the drugs was given. Of the three animals infected with *T. ugandae* the first had one relapse and was cured by two administrations of the drugs, the second had two relapses and was cured by three injections, and the third had five relapses and died after the sixth administration of the atoxyl-emetic. The author concludes that very good results are obtainable with the combined treatment in small animals infected with these strains.

Referring to the administration of atoxyl and emetic to large animals, the author points out that if performed aseptically subcutaneous injection of atoxyl is not accompanied by local irritation whereas subcutaneous injection of emetic causes violent local reaction with oedema, inflammation and sometimes necrosis of tissue. Emetic has been given intravenously in man with advantage but this method is not possible in large animals. Consequently van Saceghem tried intramuscular injection of solutions of emetic and found that good results were obtained by this method—less rigid asepsis is required, there is little pain and no local reaction. Details of the technique are given.

Regarding the rapidity with which the peripheral circulation is sterilised, the author found that in the case of *T. congolense* an injection of emetic caused the parasites to disappear from the blood of a guinea-pig in 5 minutes and in the case of *T. ugandae* in 11 minutes. Dealing with the question what gives rise to the relapse the author states that there are two hypotheses:

1. That there are resistant forms.
2. That certain trypanosomes are protected from the action of the medicament by their position in the organism, *e.g.* bone marrow, central nervous system.

He considers the second of these to be the more probable.

The author found that in combination with atropine he could administer larger doses of emetic without producing grave symptoms of cardiac depression; thus to a dog of 25 gm. he was able to give 1 cgm. of emetic per kilo without causing symptoms.

In an appendix the author states that he has put to the test his method of intramuscular injection of emetic in the treatment of animal trypanosomiasis. His first experiments were performed on small laboratory animals; the results were so satisfactory that he decided to apply the method to larger animals. Details are given of the treatment of a cow infected with *T. congolense*. The conclusions are:

1. The administration of emetic intramuscularly is superior to any other method; it is not followed by local reaction.
2. It is always advisable to use emetic and atoxyl in association.

W. Y.

WEHRBEIN (Heinrich). **Conglutination in the Diagnosis of Dourine (Trypanosomiasis of the Horse).**—*Jl. Infect. Dis.* 1915. May. Vol. 16. No. 3. pp. 461-465.

The author refers to the work of STRANIGG, who used the phenomenon of conglutination in the diagnosis of glanders. A brief description of the method is given. The system used by the author was ox serum,

fresh horse serum as complement, and sheep blood. The best titer was found to be ·1 cc. of ox serum, ·1 cc. of horse serum and ·1 cc. of a 5 per cent. suspension of sheep blood. Pure trypanosomes and an emulsion of spleen of an infected rat were used as antigen but the latter proved unsatisfactory. The method of titration of the ox serum, complement, and antigen is given in tables.

Experiments were made with 19 dourine sera; with one exceptio the results were the same as with complement fixation and in some cases the same as with agglutination. Two of the 30 normal sera tested gave a doubtful result. The conclusion is:

The conglutination method can be used for the diagnosis of dourine; but it is more sensitive to faulty technique and hence more difficult to employ than the usual complement fixation method.

W. Y.

DELANOË (P.). **Des variations du pouvoir infectieux et de la virulence de *Trypanosoma dimorphon*, L. et M. (Troisième note).**—*Bull. Soc. Path. Exot.* 1915. May. Vol. 8. No. 5. pp. 314–331. With 1 fig.

This is a continuation of the author's previous work on the pathogenicity of *T. dimorphon* [this *Bulletin*, Vol. 3, p. 253 and p. 540.] The strain *T. dimorphon*, S. C., with which this paper deals, was isolated from sheep at Sidi Coulibaly in the Ivory Coast. Delanoë found that *T. dimorphon* S.C. was not inoculable into either the guinea-pig or white rat; this applied to the trypanosome from the original sheep and also after its passage through a kid or a goat or even after it had been passed through wild rats, *Golunda campanae*. Even multiple and massive, intraperitoneal and intravenous, injections failed to infect the guinea-pig and white rat. These animals exhibit a complete natural immunity.

This immunity of the white rat is the more remarkable as the virus is highly pathogenic for the wild rat, *Golunda campanae*, which is common in the Ivory Coast. Of 21 white rats inoculated not a single one became infected, while of 23 *Golunda campanae* 22 contracted a severe infection and died, a single drop of blood sufficing to infect. The trypanosome sometimes multiplies to such an extent in *Golunda campanae* that the blood became discoloured.

T. dimorphon S.C. did not appear to be infective for other grey rats found in the neighbourhood of Bouaké; thus of four species of rodents—the white rat, *Golunda campanae*, *Arvicanthis niloticus Richardi* and *Mus concha*—*Golunda campanae* alone is susceptible.

The author concludes that there are in nature strains of *T. dimorphon* which are capable of infecting a given rodent, but unable to infect other allied species. In order therefore to obtain the best chance of isolating *T. dimorphon* (Laveran and Mesnil) in rodents, it is necessary to inoculate at the same time as large a number of species of rodent as possible.

The strain *T. dimorphon* S.C. was not infective for either *Cercopithecus callitrichus* or a young native dog; massive intraperitoneal injections of the virus failed to infect either animal.

In conclusion the author states that in his opinion the experiments he has conducted are not sufficient to exclude the possibility of infecting the guinea-pig or white rat with *T. dimorphon* S.C. In order to decide

the point it will be necessary to make further observations especially on the effect of passing the virus through bovines and equines.

W. Y.

YAKIMOFF (L.). **A propos de l'identification des trypanosomes russes.** —*C. R. Soc. Biol.* 1915. June 11. Vol. 78. No. 10. pp. 303–306.

By means of the biological test the author attempted to identify a number of trypanosomes found in Russia. He immunised goats against several of the strains and then examined the protective power of the sera of the immunised animals for the various strains. He reached the following conclusions :—

1. The trypanosomes of dourine—Russian and Algerian—are identical.
2. The trypanosome infecting asses in Boukhara is identical with that infecting camels in Boukhara and Samarkande.
3. The trypanosome causing dourine in Russia is identical neither with that found in camels and asses in Boukhara nor with *T. brucei.*
4. The trypanosome of asses in Boukhara is not identical with *T. brucei.*

W. Y.

JAXIMOFF (W. J.) & WASSILEWSKY (W.). **Sur les changements ayant lieu dans le sang du cheval à la suite de l'infection avec le trypanosome des chameaux du Turkestan.**—*C. R. Soc. Biol.* 1915. June 11. Vol. 78. No. 10. pp. 309–312.

In this paper the authors record changes in the blood of a foal inoculated with a trypanosome which had been isolated from an infected camel in Turkestan [see previous paper summarised above.] The foal lived 81 days after inoculation. Before injection the temperature of the animal was 36·9° to 38·4° C.; during the infection the temperature was always raised and on some occasions it was over 40° C. Trypanosomes were seen in the peripheral blood for the first time on the twelfth day.

The following changes in the blood were noted :—

Red Cells. Before infection their number was 8,520,000 per cmm, on the 74th day of the disease 2,008,000 per cmm.; other changes noted were agglutination, polychromatophilia, and the presence of normoblasts.

Haemoglobin. During the course of the disease the amount of haemoglobin in the blood fell from 80 per cent. to 45 per cent.

Colour index. During the first half of the disease this was below 1; the day before death it had risen to 1·8.

White corpuscles. Before infection these numbered 10,207 per cmm.; a day after infection their number increased, and then followed oscillations. There were four periods of leucocytosis.

1. Initial period which only lasted four days.
2. A second short period coinciding with the appearance of trypanosomes in the blood.
3. A third longer period of 39 days.
4. A fourth period which lasted from the 70th day till the time of death.

Relation between number of white and red corpuscles. Before infection this was 1 to 840 ; during the first half of the disease it was 1 to 1.240 and during the second half 1 to 112.

Lymphocytes. In the early days of the infection these comprised 70·3 per cent. ; after oscillating they fell during the final stage to 21 per cent. Whilst the number of lymphocytes was at its maximum the neutrophil polymorphonuclear leucocytes formed only 7 per cent. of the total leucocytes. The relatively large proportion of eosinophils (6·5 per cent.) can perhaps be explained by the presence of ascarids in the intestine. The remaining leucocytes were not affected by the injection.

Formula of Arneth. During the first period there was a temporary diminution of the corpuscules containing 2 nuclei (lobes), the number of cells containing 3 nuclei began to increase, whilst those containing 4, 5 and 6 nuclei increased slightly. In the second period the number of corpuscles containing 2 and 3 nuclei increased and of those containing 4, 5 and 6 nuclei decreased.

The curve of leucocytolysis varied inversely with the total number of white corpuscles, commencing with the figure 5·5 per cent. and reaching a maximum of 36·3 per cent.

Alkalinity of the blood. This diminished from ·58455 before infection to ·25980 on the 74th day.

The morphological change in the blood can then be summarised as follows :—1st, oligocythaemia, 2nd, oligochromhaemia, 3rd, lymphocytosis, 4th, the formula of Arneth is displaced towards the left, and 5th, the alkalinity of the blood is diminished.

W. Y.

YAKIMOFF (W. L.) & MARMER (R.). **Les changements du sang provoqués par l'Infection du chien avec le trypanosome des chameaux du Turkestan.**—*C. R. Soc. Biol.* 1915. June 25. Vol. 78. No. 11. pp. 343–345.

A dog was infected with the trypanosome obtained from a camel in Turkestan [see previous paper summarised above] ; death occurred 45 days after inoculation. The number of red corpuscles, which was before inoculation 6,018,000, diminished progressively falling at the time of death to 2,728,000 ; polychromatophilia and the presence of normoblasts was noted.

The white corpuscles numbered 12,548 before infection ; the following changes were observed : Firstly a primary leucocytosis ; secondly the number of leucocytes was almost normal, there being a tendency to leucopaenia ; and thirdly a secondary leucocytosis. The lymphocytes and neutrophil polymorphonuclear cells played the chief part in this variation in the number of leucocytes ; there was an initial diminution in the number of lymphocytes, then an increase, and finally a second diminution. The converse occurred in the case of the polymorphonuclear leucocytes.

The formula of Arneth showed a displacement to the left.

W. Y.

i. LAMBORN (W. A.). **A Preliminary Report on the Problem of controlling Glossina in Nyasaland.**—*Bull. Entomol. Res.* 1915. June. Vol. 6. Pt. 1. pp. 59–65

ii. **Observations on *Glossina morsitans* in Northern Rhodesia.** [EMINSON (R.A.F.).]—*Ibid.* Mar. Vol. 5. Pt. 4. pp. 381–382.

iii. TURNER (R. E.). **A New Species of Mutilla Parasitic on *Glossina morsitans*.**—*Ibid.* p. 383. With 1 text fig.

i. The author's first aim was to discover a small isolated fly area such as those described as "primary fly centres" by SHIRCORE [see this *Bulletin*, Vol. 3, p. 427], with a view to carrying out experiments in the clearing of bush. He therefore proceeded to the area in which SHIRCORE described these centres and examined two before the rains and two subsequently. In the region of one fly was caught over a distance of eight miles from east to west and ten from north to south; in the case of the other centres the results were similar. He was not able to obtain any evidence of the natural splitting up of the northern portion of the fly area in the dry season into two small localised patches, as described by SHIRCORE, and in the southern portion the two so-called primary centres were continuous with each other and with the northern portion of the area. He goes on to say that undoubtedly the fly is more concentrated in this district in the dry season than in the wet, coincident with the greater concentration of the game which then takes place. This is due to its limitation to the areas where shade, water and grass are to be found. "It seems a natural corollary that the fly which, so far as has been ascertained at present, is entirely dependent on the game, should concentrate at the same time." He has not been able to discover that the primary centres form localised breeding grounds, as was surmised by SHIRCORE.

Experiments were conducted to determine the range of flight of *Glossina morsitans*. A total of 920 flies was marked by the method of snipping off a foot through the middle of the metatarsus. The results are shown in a table. Evidence was obtained of ten flights of five miles, and of one flight of not less than ten miles back to the locality from which the flies were originally taken. No flies were fed previous to release. The author proposes to continue these experiments, using also flies which have been well fed before release. Of 2,460 *Glossina morsitans* captured in November and December 2,040 were males and 420 females.

The experiment was made of placing a goat in a wire mosquito-proof cage, the outer side of the cage and the under sides of branches of trees near by being smeared with bird lime. Eight flies were taken in the course of seven days. When the goat was removed and paraded up and down it was much assailed by the flies. Experiments were made in the use of English bird lime spread on various materials placed on the backs of natives. The results are tabulated. The experiments were too few for definite conclusions to be drawn, but light brown paper seemed as effective a material as any.

The experience of the author is that the faster one moves the more one is pestered by flies, so that now he invariably walks rather than cycles in a fly area. The examination of 43 following flies showed

that all were males. Flies were observed to follow a distance of two-and-a-half miles over the open plain and in one place a distance of five.

ii & iii. As regards breeding places, in country otherwise suitable no favoured breeding places have been found in any localities in which there was any depth of sandy soil or in which there was dense growth of long grass.

The favoured area is described as being "uniformly covered with forest trees; very little grass grows amongst the trees, and that little is short; the soil is of a sandy gravelly nature and very thin, merely covering the underlying granite which crops out in places. The surface of the ground shows a gentle slope in a north-westerly direction to a vlei [open, moist, low-lying land] in which a little water stands in the wet season, but which is completely dry at this season [mid-winter]. I cannot say that I have noticed much spoor of game, except some impala and warthog; certainly I should not say that there was any more game than in the surrounding country, if as much. The breeding places which yielded the greatest number of pupae and empty pupa-cases were situated near the path; the fly had evidently been feeding on game, or more probably human beings, preparatory to depositing their larvae."

During May 1914 300 flies were examined to see on what they had fed. Recognisable blood was found in 43—in 41 cases mammalian and in 2 non-mammalian. In a batch of 258 collected Glossina pupae there emerged from one puparium a parasitic wasp of the genus Mutilla. The wasp had broken open the puparium in precisely the same way as would the fly itself. Seven of the unhatched pupae were opened and two found to contain larvae of the parasite. From the 77 remaining puparia two males and eight females of the Mutilla were bred out. A specimen forwarded by Mr. Dollman which reached the British Museum is described by Mr. R. E. Turner as a new species under the name of *Mutilla glossinae*. In addition to this parasite Eminson obtained 35 specimens of a Chalcid from a single tsetse pupa.

A. G. B.

Ouzilleau (F.). **Rapport d'ensemble sur la maladie du sommeil dans le Bas-M'Bomou (1912-1913).**—*Bull. Soc. Path. Exot.* 1915. Apr. Vol. 8. No. 4. pp. 178–198.

This paper concludes the report of the author on sleeping sickness in Bas M'Bomou, the first portion of which has already been summarised [see this *Bulletin*, Vol. 5, p. 408].

The author gives an account of his itinerary and of the manner in which the population was examined for trypanosomiasis. On his arrival at a village all the inhabitants were assembled and ranged in six groups according to sex and age—men, women, youths, maidens, small boys and small girls. The number in each group was then ascertained and each individual examined. In view of the large number of persons to be examined inspection and gland palpation were relied upon. About 80 per cent. of the cases seen exhibited distinct clinical signs of the infection—typical facies with or without enlarged cervical glands; the remaining 20 per cent. were doubtful clinically but they had enlarged glands resembling those of trypanosomiasis. The former class were declared infected without further examination, trypanosomes being searched for in the latter class only. In discussing the errors of diagnosis the author mentions other causes of glandular enlargement in children and adults.

Successive visits permit of the cases being re-examined; thus in the Hetmann district 1,529 of a total of 1,752 patients have been re-examined. Of these 1,529 cases, 328 have been seen twice, 621 three times, 563 four times and 17 five times.

The treatment is described. A 10 per cent. solution of atoxyl was made and sterilised by boiling; as soon as it had cooled it was injected under the skin of the flank of the patients who had been ranged in a row; the adults received 10 cc. and the children 5 to 8 cc. according to their age and strength. Children tolerated these high doses well; the patients regarding whom it was necessary to be cautious were the aged and those who exhibited marked oedema or were cachetic. No special antiseptic precautions could be adopted but if a patient was suspected to suffer from syphilis or leprosy the needle was flamed before being used on the next case. Abscesses were very rare—only 1 in 500 cases—and the risk of conveying syphilis or other infection by the needle must be minimal as the solution of atoxyl would impede the development of the germs.

Amongst the Yakomas 3,844 cases of sleeping sickness were found in October 1912, 400 in January 1913, and 230 in March 1913, making a total of 4,474 patients. Of these 2,159 were treated once only, 1,475 received two injections and 840 three injections; in all 7,629 injections of atoxyl were made. In the first journey 42·06 per cent. of the inhabitants of Yakoma were found to be infected; in the two subsequent visits 630 new cases were discovered making a total of 49·06 per cent. Probably however the total population instead of being 9,000 was nearer 11,000, and thus the true percentage of infected cases was approximately forty.

A single visit extending from June 6th to September 25th was paid to the Zandés; 8,560 persons were examined and 1,751 (20·40 per cent.) found to be infected. Of these 228 were treated once, 328 received two injections of atoxyl, 620 three injections, 563 four injections and 17 five injections; in all 5,079 injections (comprising almost 5 kgm.) of atoxyl were given.

Amongst the native employees of commerce a considerable number (4–16 per cent. in different localities) of infected persons were found: these were all treated with atoxyl, receiving on an average four injections each. A number of cases were also discovered amongst the native troops and civil servants.

Only a single case was found amongst the Europeans. He had apparently become infected in 1909 and when seen by the author was in an advanced stage of the disease exhibiting ocular lesions—retinitis of the left eye and irido-choroiditis in the right. Between October 1912 and October 1913 he received 13 gm. of atoxyl in 13 doses of 1 gm. each. All the symptoms disappeared, the adenitis had almost entirely subsided and the ocular lesions had remained stationary.

With reference to atoxyl as a remedy for trypanosomiasis the author states that it should be given in sufficiently large doses (15 mgm. per kilo. of body weight). Such doses sterilise the peripheral circulation in some hours, smaller doses are insufficient. Man is the reservoir of the virus of sleeping sickness and as atoxyl sterilises the peripheral circulation it is an excellent prophylactic. Repeated injection of 15 mgm. per kilo. every 15 days or even every month for a year gives in the majority of cases a complete cure.

The author contrasts the value of the results obtained from medical men visiting the infected districts and there treating the patients, with those obtained from the establishment of central hospitals and treatment of patients at these institutions. He states that the only patients that benefit from the latter method are those who live in the vicinity of the hospitals; the others remain untreated either because they are too remote or because they do not desire treatment.

Other means of combating sleeping sickness are discussed, such as clearing the bush around the villages and on the banks of streams near the village, the removal of rubbish and of receptacles which can hold water wherein insects and mosquitoes can breed, and general hygienic measures which include the construction of suitable dwellings, the building of villages on desirable sites, the cultivation of crops and the prohibition of all usages which tend to degrade the individual and race such as alcoholism, slavery and cannibalism. Emphasis is laid on the damage done by alcohol and to a less degree by slavery.

In Yakoma, which is so decimated by sleeping sickness, Glossina is rarely encountered, but *G. palpalis* exists in the forests on certain tributaries of the Oubangui—the Koto, the Mbarague and the Nari. Stomoxys is not met with but there are on the contrary large numbers of tabanids and mosquitoes (Culex and Mansonia). Anopheles is rare and is represented by the genus Myzomyia. In the district of Rafai *G. palpalis* is found, but in Semongo where sleeping sickness is very marked only *G. morsitans*; Culex and Mansonia are not rare, and in the valley of the Haute Ali (Derbisaka) Mansonia are very abundant. At Zimas Chinko anopheles (Myzomyia) are found in numbers. The infected area of N'Zakara contains the same biting insects: *G. palpalis* on the M'Bari and its tributaries as far as its confluence with the Kobou, then *G. morsitans* on the Haut M'Bari. Other biting flies of the infected area are Stomoxys, Tabanidae, Simulium, Ceratopogon, Haematopota and a few Chrysops. The author considers that although Glossina is possibly responsible for the maintenance of the endemicity of the infection other insects, especially mosquitoes, are the cause of the epidemics.

T. pecaudi appears to be the trypanosome most commonly found in domestic stock. Most of the infected animals became emaciated and died but occasional beasts remained in good condition.

W. Y.

LAVERAN (A.). **Sur les variétés acentrosomiques artificielles des Trypanosomes.**—*C. R. Acad. Sci.* 1915. Apr. 26. Vol. 160. No. 17. pp. 543–546.

The author briefly notes the work done previously in inducing a blepharoplastless condition in various trypanosomes by the use of oxazine. He has now studied the action of tryposafrol on various trypanosomes, and finds that they react to it in the same way as to oxazine.

Mice infected with *Trypanosoma brucei* were treated with 0·5 mg. to 1 mg. of the drug per mouse of 20 grams weight. After the 16th passage, the blepharoplasts had completely disappeared and this feature was retained after passage through untreated animals.

Trypanosoma soudanense, *T. gambiense* and *T. rhodesiense* gave incomplete results, the blepharoplasts disappearing from some of the

trypanosomes only. The non-pathogenic trypanosomes, *T. lewisi* and *T. duttoni*, are the most refractory. Blepharoplastless *T. evansi* has now undergone 450 passages (from 1911 up to April 17th, 1915) and the trypanosomes have remained without blepharoplasts. Passage through guinea-pigs, dogs and goats has not restored them. Similarly, blepharoplastless *T. brucei* has undergone 136 passages through mice, 111 through rats and 26 through guinea-pigs, making 273 passages in all, but the blepharoplasts have not reappeared.

Laveran states that biological as well as morphological tests are necessary to establish the identity of a trypanosome. He recalls the work of MESNIL and himself on cross-immunity, and applies the idea to immunity of hosts against normal trypanosomes and the corresponding blepharoplastless strains respectively. It is stated that the immunity which follows from an infection due to blepharoplastless *T. evansi* or *T. brucei* is only a little less complete than that following infections from either of the normal strains. *T. brucei* and *T. evansi* without blepharoplasts are a little less virulent than the corresponding normal forms. Laveran's experiments on goats and sheep showing the diminution in virulence of the blepharoplastless strains of these trypanosomes are given.

The results obtained indicate that if it is desired to inoculate surra or nagana to Capridae or Bovidae in order to produce immunity, use should be made of the blepharoplastless races of *T. evansi* and *T. brucei* respectively.

H. B. Fantham.

WOODCOCK (H. M.). **On the Occurrence in Certain Cases of a Definite Transmissive Phase of a Trypanosome in the Vertebrate Host.**—*Arch. f. Protistenkunde.* 1914. Nov. 3. Vol. 35. No. 2. pp. 197–198.

Referring to a paper by NÖLLER [see this *Bulletin*, Vol. 4, p. 269 and Vol. 5, p. 318], the author remarks that MINCHIN and himself showed clearly in 1911 that in *Trypanosoma noctuae* of the little owl "there is a characteristic and distinctive form which is the transmissive phase, passing into the mosquito and there initiating the other half of the life-cycle. This type is a small or medium sized, stout spindle, quite different from any of the other forms of the parasite; it is present, alone, in the peripheral circulation, during the early summer months." Woodcock found a similar phase in *T. fringillarum*, and ROBERTSON has found one in *T. gambiense* in vertebrates.

H. B. F.

Reprints and Pamphlets received :—

BREINL (A.). The Distribution and Spread of Diseases in the East. Protozoa and Disease. The Influence of Climate, Disease, and Surroundings on the White Race living in the Tropics.—*The Stewart Lectures of the University of Melbourne*, 1913. 31 pp. With 31 figs. 1914. Melbourne: McCarron, Bird & Co.

BREINL (A.) & PRIESTLEY (H.). Changes in the Neutrophile Blood Picture of Arneth observed in Children living in Tropical Queensland.—*Ann. Trop. Med. & Parasit*, 1914.

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BREINL (A.), PRIESTLEY (H.) & FIELDING (J. W.). On the Occurrence and Pathology of Endemic Glandular Fever, a Specific Fever, occurring in the Mossman District of North Queensland.—*Med. Jl. of Australia*, 1914.

BREINL (A.) & YOUNG (W. J.). The Occurrence of Lead Poisoning amongst North Queensland Children.—*Ann. Trop. Med. & Parasit*, 1914.

CHICAGO. The Memorial Institute for Infectious Diseases. Brief History and Description, 1915. Chicago.

CLARENC (J. F.). The Manufacture of Sugar in Louisiana.—*Mauritius Dept. of Agriculture Bull.* No. 4. 1915.

HONEIJ (J. A.). A Study of Leprosy: with Especial Reference to the Pulse and Temperature.—*Boston Med. & Surg. Jl.*, 1915.

LA-PUENTE (Ignacio). Paludismo en la costa del Perú. Etiologia—Formas Clinicas—Profilaxis. Memoria presentado al V Congreso Médico Latino Americano.—69 pp. 1914. Lima.

MARSHALL (D. G.). Primary Malignant Adenoma of the Liver simulating Tropical Abscess.—*Edinburgh Med. Jl.*, 1915.

STRICKLAND (C.). The Comparative Morphology of the Anophelines *Nyssomyia ludlowi*, Theo., and *N. rossi*, Giles.—*Bull. Entomol. Res.*, 1915.

Note.—Any of the foregoing reprints or pamphlets will be sent on loan to any part of the world on application, the Bureau paying outward postage.

Books received.

ASHBURN (P. M.) [Major.] The Elements of Military Hygiene especially arranged for Officers and Men of the Line.—2nd Edit., viii + 351 pp. Crown 8vo. 1914. Boston & New York: Houghton Mifflin Co. [Price $1.50 net.]

BAHR (P. H.) [M.A., M.D., D.T.M. & H. (Cantab.) M.R.C.P. (Lond.), M.R.C.S.] A Report on Researches on Sprue in Ceylon. 1912–1914.—ix+155 pp. With 8 plates. 1915. Cambridge: at the University Press. [Price 7*s*. 6*d*. net.]

Books received—*cont.*

BROOKE (Gilbert E.) [M.A. Cantab., L.R.C.P. Edin., D.P.H., F.R.G.S.] Aids to Tropical Medicine.—2nd Edit. xii+230 pp. F'cap 8vo. With 30 text-figs. 1915. London: Baillière, Tindall & Cox. [Price 3*s.* 6*d.* net cloth, 3*s.* net paper.]

CUNNING (Joseph) [M.B., B.S., F.R.C.S.] Aids to Surgery.—3rd Edit. xiii+416 pp. F'cap 8vo. 1913. London: Baillière, Tindall & Cox. [Price 4*s.* net.]

EALAND (C. A.) [M.A.] Insects and Man: An Account of the more Important Harmful and Beneficial Insects, their Habits and Life-Histories, being an Introduction to Economic Entomology for Students and General Readers.—343 pp. Illustrated with Drawings and Reproductions from Photographs. 1915. London: Grant Richards Ltd. [Price 12*s.* net.]

GABBI (Umberto). Trattato Elementare di Patologia Esotica ad uso di Medici e Studenti.—xv+347 pp. S. Roy. 8vo. With 3 plates & 69 text-figs. 1915. Roma: Tipografia Nazionale di Giov. Bertero E.C. [Price not stated.]

KENWOOD (H. R.) [Temporary Lieut.-Col. R.A.M.C.; Professor of Hygiene and Public Health in the University of London, etc.] Health in the Camp: A Talk to Soldiers.—vii+58 pp. Demy 16 mo. 1915. London: H. K. Lewis. [Price 3*d.* net.]

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